WORLD PETROLEUM REPORT 1959

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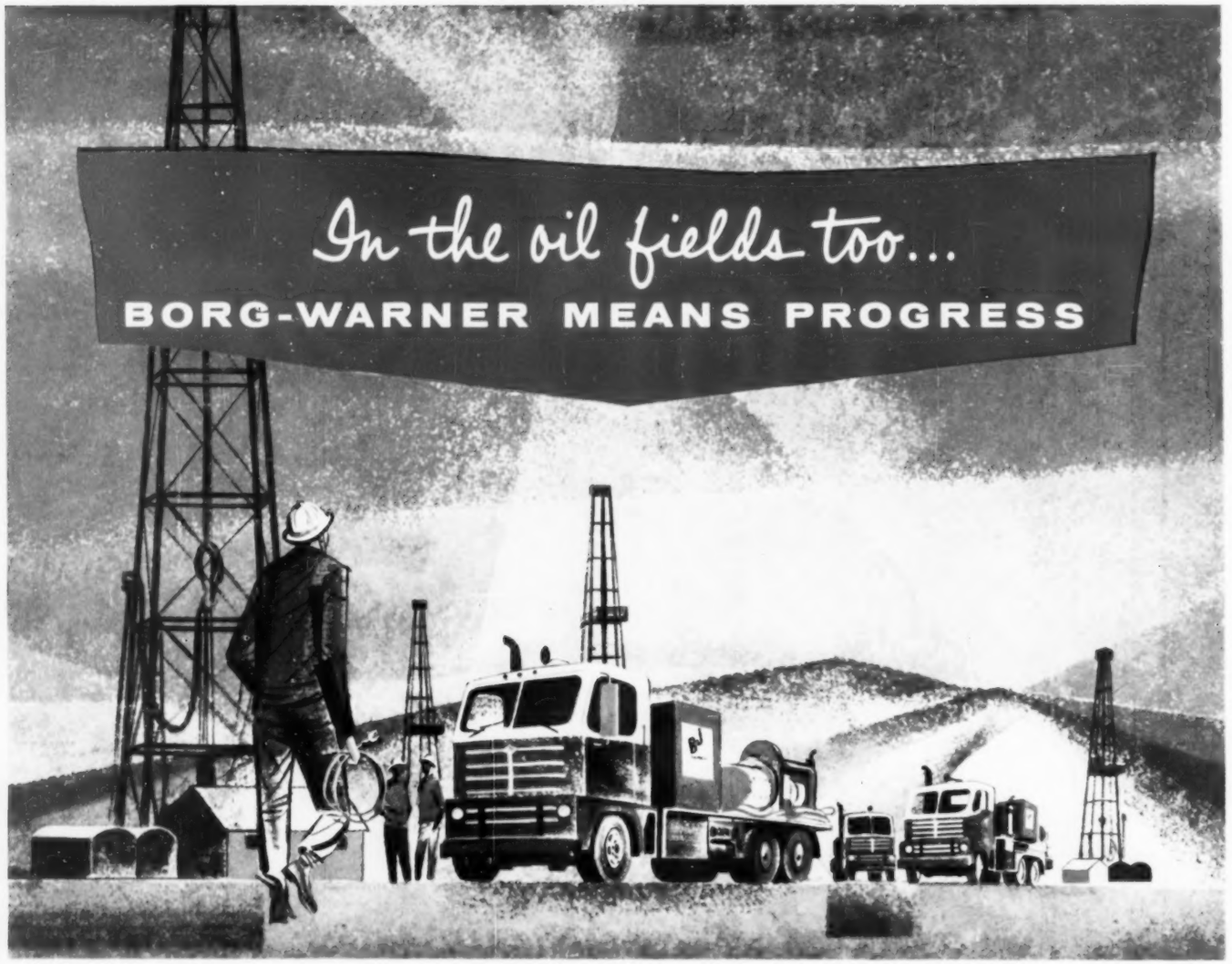

Wherever you look in the petroleum industry . . . at the well site, along the pipeline, at the refinery . . . you see impressive evidence of the Borg-Warner "design it better—make it better" tradition.

You see it in the full line of tools . . . power units, tubing tongs, spiders, slips, scratchers, centralizers, hooks, elevators and other tools . . . from B-W's Byron Jackson Tools. In the cementing, fracturing, acidizing, perforating and other well services provided by Borg-Warner's BJ Service. In the pipeline pumps, hot-oil processing pumps and cooling pumps from Byron Jackson Pumps.

It's there, too, in B-W's Morse Hy-Vo® chain drives, roller and silent chain, and "Timing"® belts. And in Rockford Clutch Division's power take-offs and heavy duty clutches for oil field applications.

Each of these B-W products and services points up the advanced thinking, skilled engineering and fine quality that promise continuing Borg-Warner contributions to petroleum progress.

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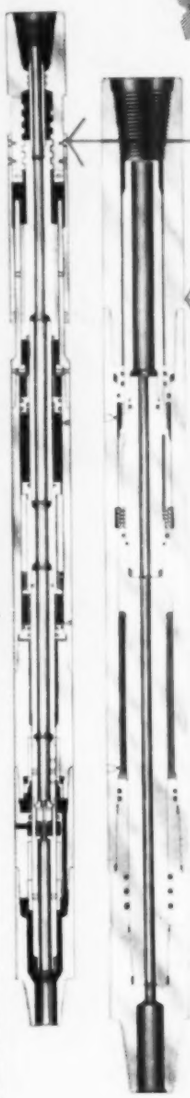

The Johnston Shut-In Hydraulic Tester. Designed for positive operation under a wide range of testing conditions. One-piece construction means quicker "make-up" and "break-down" saving valuable rig time.

The newest Johnston Jar, the Type HS-1 Hydraulic Jar, answered the needs dictated by drill stem testing operations. More jarring action from this "easy to maintain" tool. Shorter for "easier handling" and faster "make-up." Designed to consistently deliver and withstand innumerable shocking blows.

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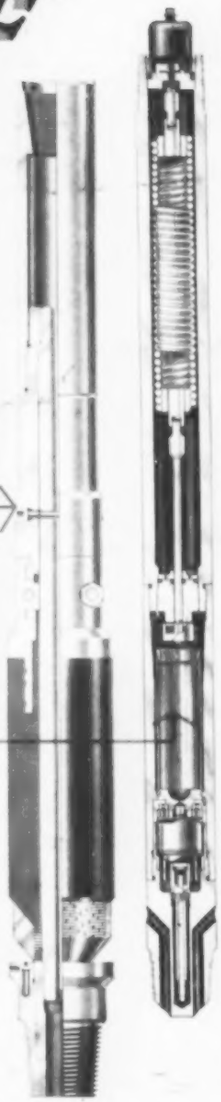
Johnston Type "T" Pressure Recorder. Unfailing accuracy, sensitivity and dependability under all types of formation testing conditions. Extensive laboratory and field tests proved the Johnston Tension Type recorder to be more accurate and consistently dependable under all conditions.



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Link, swivel & block bumpers

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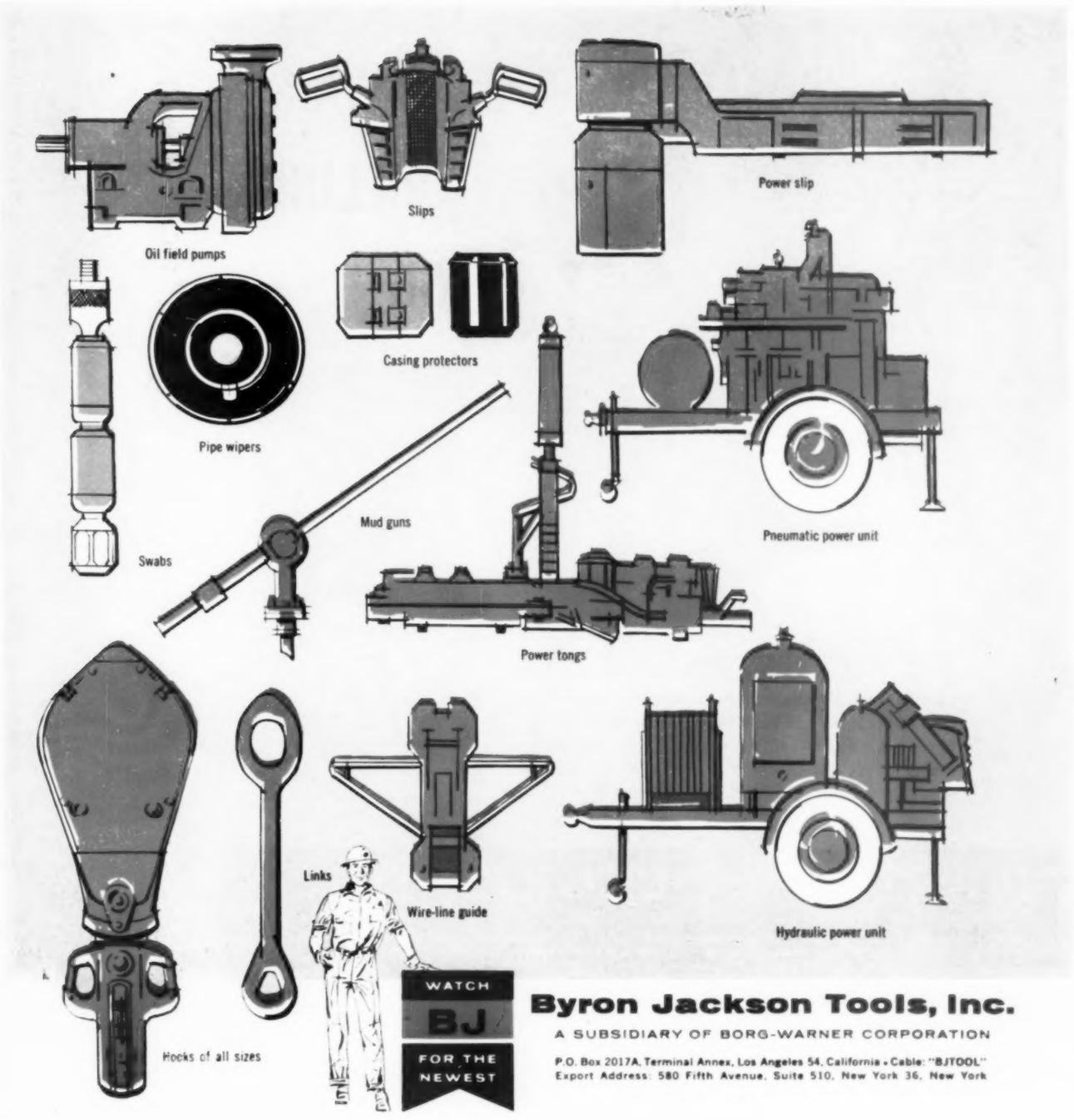

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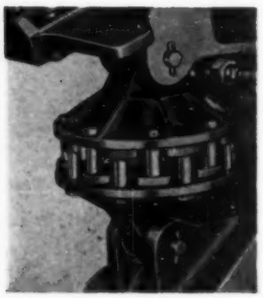

The Martin-Decker
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This new kind of diaphragm pressure transformer works with your National Wire Line Anchor and transmits direct, no-lag signals to your Martin-Decker Type "D" or "E" Weight Indicator. The Sensater's rugged mobile diaphragh does not deflect, but moves with its backing plate to give a piston-like stroke without a friction-causing piston rod. Unaffected by temperature and fluid changes.

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In these and in many other ways Caltex continues to serve nations, economies, individuals.

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BAKER
production packers

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SINGLE ZONE OR MULTIPLE-ZONE

BAKER MODEL "D" RETAINER PRODUCTION PACKER

PRODUCT NO. 415-D

The most widely used drillable packer in the world. Contains continuous sealing bore and flapper-type back-pressure Valve.

BAKER MODEL "DA" RETAINER PRODUCTION PACKER

PRODUCT NO. 415-DA

Direct variation of Model "D" with a larger I.D. sealing bore located in the upper end of the packer. Permits larger bore through the packer accessories. Used as an upper packer in two-packer flowing or pumping, parallel string hook-ups.

BAKER MODEL "F" RETAINER PRODUCTION PACKER

PRODUCT NO. 415-F

Related design to Model "D." Contains larger continuous bore than Model "D." Used where extra large bore is required in some parallel (triple) string, flowing or pumping hook-ups.

BAKER MODEL "FA" RETAINER PRODUCTION PACKER

PRODUCT NO. 415-FA

Related to the Model "F" Packer in the same manner that the Model "DA" is to Model "D." Contains extra large upper sealing bore. Provides largest I.D. of any retainer-type packer. Used primarily in multiple string hook-ups.

BAKER MODEL "H" RETAINER PRODUCTION PACKER

PRODUCT NO. 416-H

Similar to other Baker Retainer Production Packers, but employs differently designed components. Is set on tubing ready for production in one-half a round trip. Same bore size as Model "D"; and can use same accessories once the setting seal mandrel is removed.

Out of this *complete* line of new and modern packers you can fulfill any production need from simple single-zone installations through the increasingly popular and profitable multiple-completions to efficient water-flood applications.

Regardless of depth, pressure differentials, temperatures or other well conditions, one (or a combination) of these Baker Packers is exactly "tailored" to your well requirements. Baker offers the complete line, both retrievable and drillable types—with a choice of setting methods—to satisfy any surface or sub-surface condition.

Turn to Page 492 of your new BAKER (or Composite) Catalog for the 46-page section containing complete descriptions, applications and specifications on all Baker Packers.

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Double-Grip PRODUCT NO. 741-G

The ideal retrievable upper packer for two-packer, parallel string dual-zone installations. Embodies full-opening, long string through lower packer with separately retrievable short string that can be anchored to upper packer if desired. Double-Grip version is identical to Single-Grip, but in addition contains hydraulically actuated, button-type hold-down.

BAKER MODELS "MOA" AND "MOB" CROSS-OVER SNAP-SET PACKERS

PRODUCT NOS. 636-MOA AND 636-MOB

Used as the upper retrievable packer in single-string two-packer, selective cross-over tubing and annulus dual-zone production hook-ups. Set with set-down weight. Released and recocked for repeat setting by picking up on tubing. Also available with hydraulically actuated button-type hold-down.

BAKER DUAL PUMPING PACKER

PRODUCT NO. 694

Used as the upper retrievable packer in two-packer pumping hook-ups involving dual-zone pump. Set and released in same manner as Cross-over Snap Set packers above.

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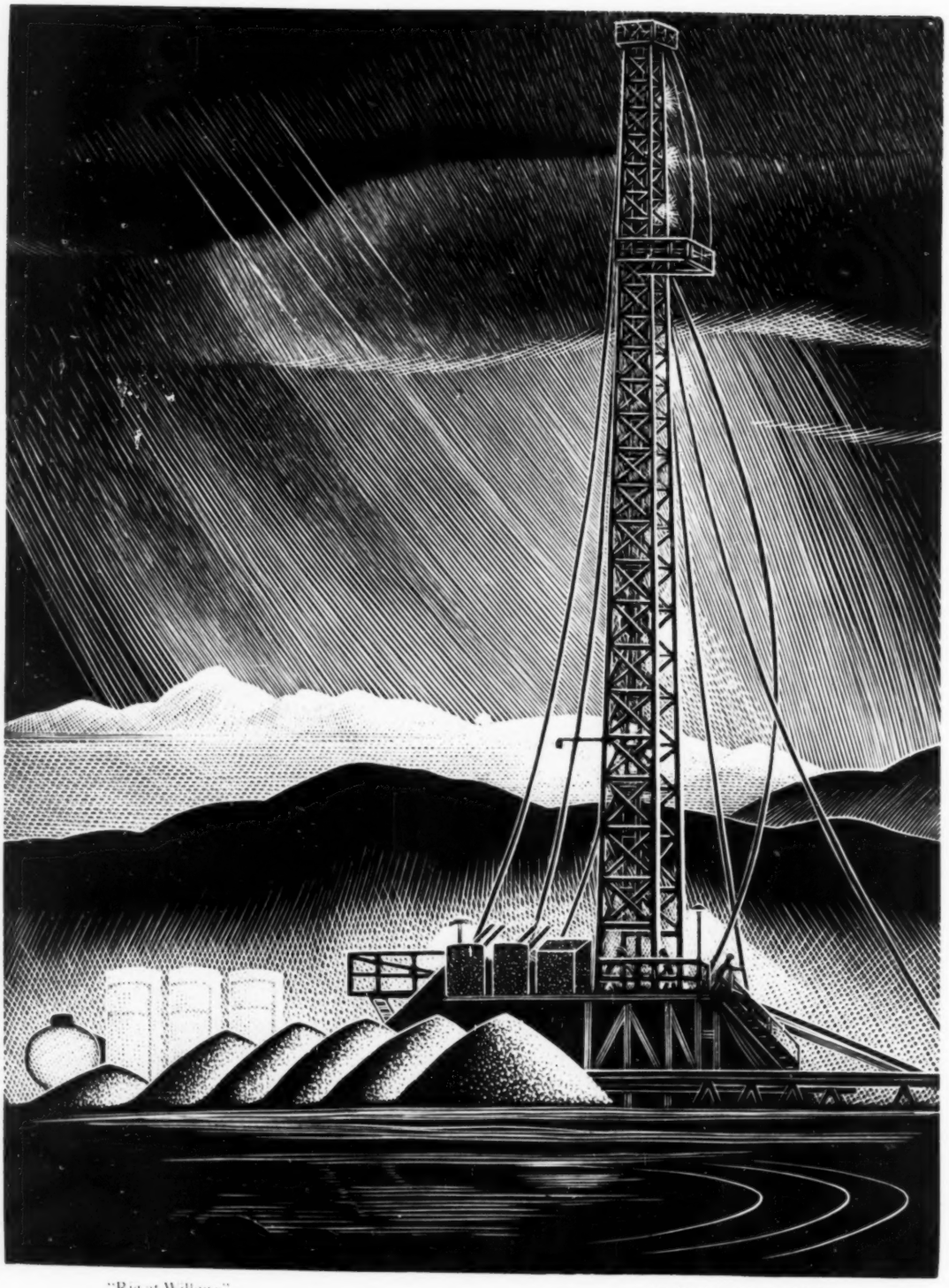
PRODUCT NO. 420-E

One of the shortest, most compact, set down retrievable packers available. Ideal for light or medium duty production requirements, or for all-around water flooding use. Simple J-Slot setting mechanism. Also available with hydraulically actuated button-type hold-down.

BAKER MODEL "A" RETRIEVABLE TENSION PACKER

PRODUCT NO. 739-A

One of the shortest, most modern high-performance tension packers. Ideal for economical low- or high-pressure water flooding. Rugged enough for many high-pressure fracturing and acidizing operations. Simple J-Slot setting mechanism.



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we train 85% of the native Cuban workmen in the technicalities of construction. These men were developed into highly skilled workers, other previously trained mechanics were up-graded and perfected in various construction trades.

we solve some tough problems. 1 and 2. Prefabricated crude atmospheric column was unloaded and floated ashore overcoming expensive and time-consuming transport problem. 3. Prefabricated panels go on Platformer and crude heaters. 4. Some of the foundations and piping trenches were blasted from solid rock.

FOR TEXACO IN CUBA

And here's how we did it . . . Solving challenging construction problems proves Procon's ingenuity.

It's a pretty exacting business at best, building a refinery from scratch. Add a double handful of natural, geographical and human problems to it and you've got a fairly clear picture of the challenges Procon met and overcame to give The Texas Company (West Indies) Limited this handsome refinery, the first ever built in eastern Cuba.

The pictures you see here tell some of the story of how this 20,000 BPSD refinery was built by Procon three miles south across the bay from Santiago.

If you have a refinery in mind . . . or a petrochemical plant, or a chemical plant or individual process units for any of these . . . you can be sure of top-flight construction anywhere in the world when you call on Procon to do the job.

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And here's the finished job. A beauty, capable of pumping 20,000 barrels a day into the hungry transport arteries of Cuba and adjoining countries.

OIL... *in Western Venezuela*

Crude oil output in Venezuela, one of the world's leading producers, comes mainly from the western part of the country, in the Lake Maracaibo area, although fields in Eastern Venezuela contribute approximately a third of the total production.

Amongst the diversity of drilling equipment in service in this oil-producing area, Paxman diesels are doing a job of unfailing service driving draw-works, rotary tables and slush pumps, both up country and on offshore rigs. These engines come from a range developed from 16,000,000 hours drilling experience, known by oil men everywhere for their sound performance, rugged construction and dogged dependability.

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Above is a Shell photograph of one of their drilling barges on Lake Maracaibo. Four Paxman sets provide power for the slush pumps and two more Paxman engines drive alternators for power and lighting.

The drawing at left is taken from another Shell photograph of a Paxman engined Cia. Shell de Venezuela deep drilling rig at La Paz field.

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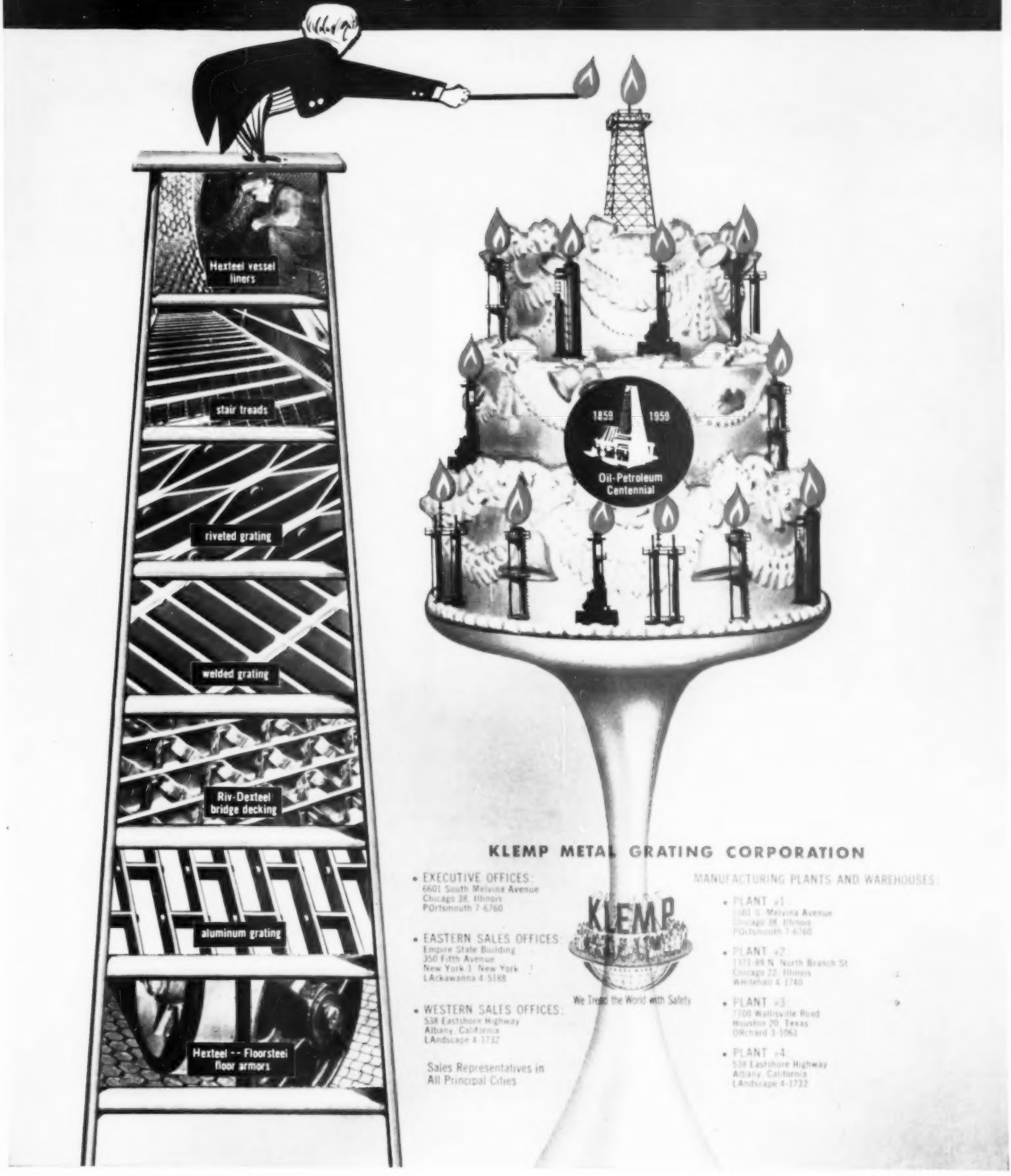

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If you have the problem of increasing octane rating and production in your existing equipment, investigate the unique performance of Sinclair-Baker RD 150 Platinum Reforming Catalyst. Its efficiency in producing *important yield increases at high octane levels* is a matter of record. The long period of RD 150 operation is unmatched by any other catalyst . . . further, *it is regenerative in situ!* Cost is sharply reduced to lowest level.

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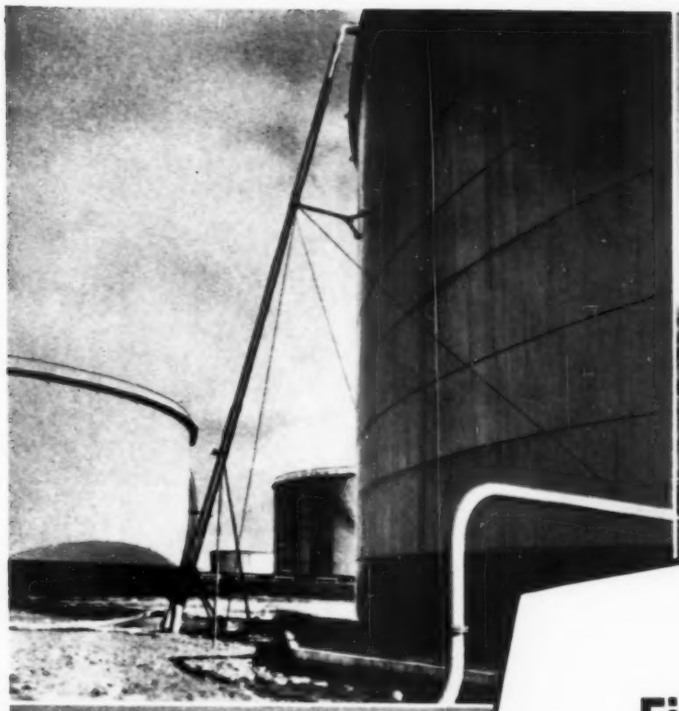

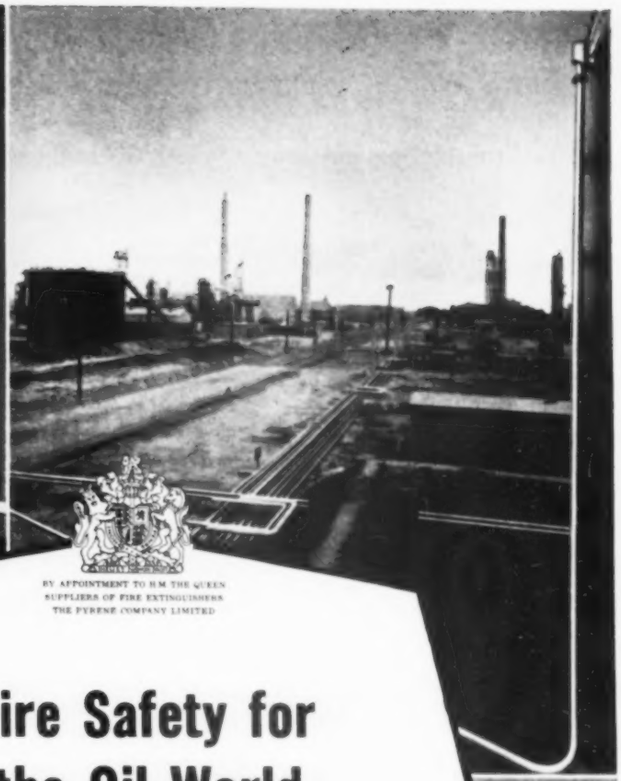

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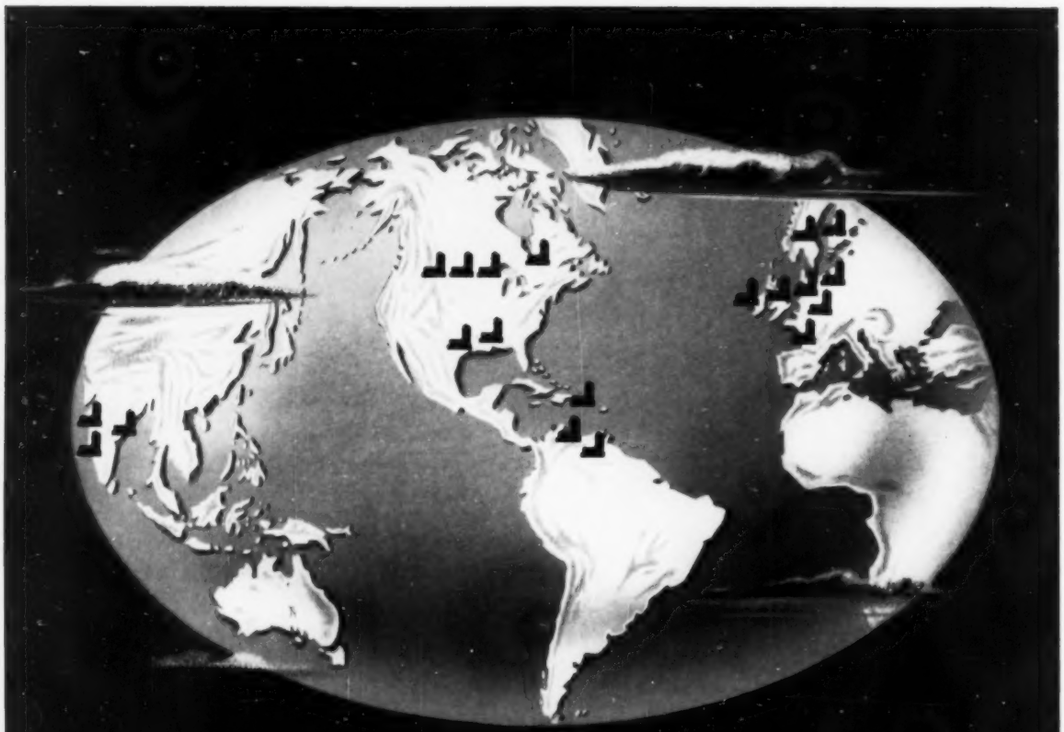

LUMMUS ENGINEERS AND CONSTRUCTS 20 COMPLETE REFINERIES SINCE END OF WORLD WAR II

World-wide Lummus Organization also completed hundreds of other units in same period . . . From Cardon, Venezuela, to Bombay, India—from Corpus Christi, Texas, to Turku, Finland—this string of modern "grass-roots" refineries testifies to the engineering skill of the Lummus staff. That staff includes over 3,000 permanent employees, located in seven branch offices and subsidiaries throughout the world.

When you plan a new facility—oil refinery, chemical or petrochemical plant—Lummus can put 50 years of experience on more than 700 process-industry plants throughout the world to work for you.

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2. Refinery for Koppartrans Oljeaktiebolag at Gothenburg, Sweden
3. Refinery for Venezuela Gulf Refining Company at Puerto La Cruz, Venezuela
4. Refinery for Societe Generale des Huiles de Petrole at Dunkirk, France
5. "Portable" refinery for U. S. Navy Department
6. Lube oil refinery for Cit-Con Oil Corporation at Lake Charles, Louisiana
7. Refinery for International Refineries Inc. at Wrenshall, Minnesota
8. Refinery for Vacuum Oil Company Ltd. at Coryton, England
9. Refinery for Burmah-Shell Oil Company at Bombay, India
10. Refinery for Standard-Vacuum Oil Company at Bombay, India
11. Refinery for Standard Oil Company (Indiana) at Mandan, North Dakota
12. Refinery for Suntide Refining Company at Corpus Christi, Texas
13. Refinery for Commonwealth Refining Company at Ponce, Puerto Rico
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WORLD PETROLEUM REPORT

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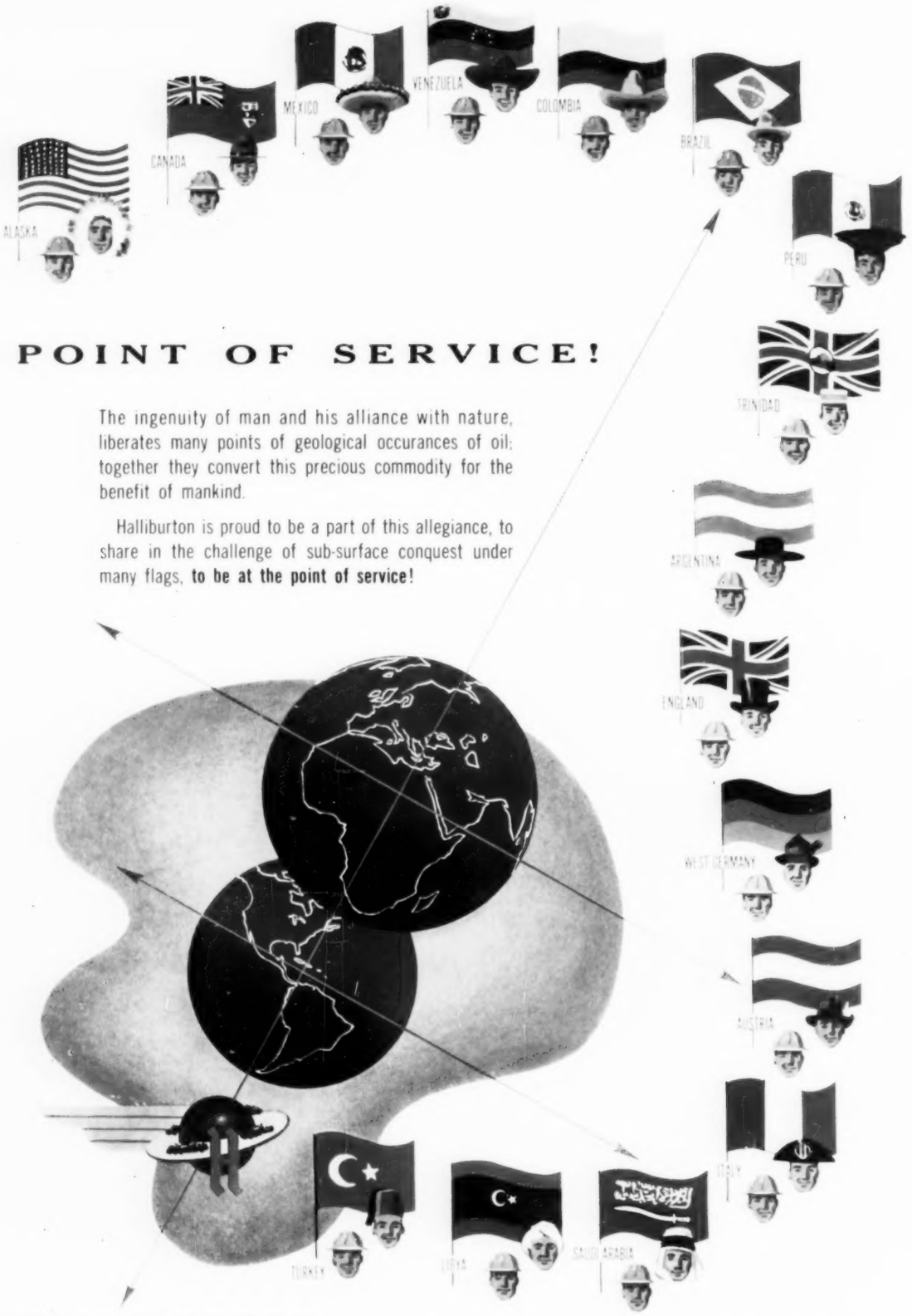


POINT OF SERVICE!

The ingenuity of man and his alliance with nature, liberates many points of geological occurances of oil; together they convert this precious commodity for the benefit of mankind.

Halliburton is proud to be a part of this allegiance, to share in the challenge of sub-surface conquest under many flags, **to be at the point of service!**

HALLIBURTON OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

WORLD

The purpose of this section is to give an overall view. Detailed reviews are found in the appropriate regional or country section of this volume. To conserve space, basic, unchanged information given in either of the two previous editions is *not* repeated; instead, reference is made to the previous edition.

PHYSICAL DEVELOPMENT

EXPLORATION: The effort devoted to finding oil is estimated to have increased to record levels during 1958. The Western Hemisphere, especially the United States and Canada, dominated the scene by sheer size. In terms of relative increase, however, Africa and the Middle East held the world's attention, with Latin America next in interest, especially in Argentina's new drilling contracts. Interest thereafter focused on Alaska and Canada. Europe had no development of particular significance; and Asia, long starved for energy to feed her growing population, received little encouragement in the way of oil discoveries.

Geophysical: Effort declined slightly in 1957. During 1958, the same general pattern continued —increases in the Eastern Hemisphere and decreases in the Western. Some 320 seismic crews are estimated to have operated in Russia during 1957.

Drilling: Total number of wells completed during 1958 show a decrease in the world's total wells. Here again, this was due to decreases in the Western Hemisphere; all other areas increased. In percentages, the world's well completions in 1958 are estimated to have dropped about 9% from 1957 levels, to around 55,545 wells. The United States, with an estimated 47,950 wells during 1958, declined 10.5%; the rest of North America (including Mexico and Cuba) declined 22.5%, with 3,018 wells; and South America (including the rest of the Western Hemisphere) declined over 14%, with 2,317 wells. (The decline was due to the drop in Venezuela; the rest of South America increased.) In the Eastern Hemisphere, almost all areas increased over 1957. Western Europe, with 1,215 wells, was up about 5.2%; Africa, with 270 wells, was up about 20%; the Middle East, with 240 wells, was up about 20%; and the Far East and Australasia were up about 1.7%, to 535 wells in 1958.

An enormous increase in exploration and development drilling outside the United States has occurred during the past seven years. According to estimates by the *Bulletin of the American Association of Petroleum Geologists*, total drilling for oil and natural gas in the Free World outside the USA during 1957 amounted to 8,980 wells, comprising 2,657 exploration wells, 6,308 development wells, and 15 wells not classified. This total of drilling is nearly three times as great as seven years ago. Drilling in the United States during 1957 totaled 52,777 wells, compared with 42,039 seven years previously. Total world was 61,757.

Outside the United States, the most drilled producing region is western Canada, where some 3,450 wells were drilled in 1957. Venezuela, in 1957, accounted for an estimated 1,746 wells. In the rest of Latin America and the Caribbean, drilling almost doubled to an estimated total in 1957 of 3,545. In the Far East and Australasia, drilling rose to 419; in western Europe it rose 2½ times, to 1,167 wells. There was also a 70% increase in Africa. The Middle East drilled 220 wells. Outside North America and the Communist bloc countries, about 1,460 exploration wells were drilled in 1957. This compares with about 610 in 1950, and gives striking emphasis to the growth of exploration outside North America.

PRODUCTION: World production of crude petroleum hit an all-time peak in 1958 (see table); but more significant was a slackening in the rate of increase, only 2.4% during 1958. Previous years increased much more rapidly. Prospects are good for 1959, however, when a larger increase is anticipated.

According to the Petroleum Information Bureau in London, USA companies in 1957 accounted for 73% (11.7 million barrels per day). British and associated Dutch companies increased their share of production to 14.5% from 14.4% in 1956. The Soviet bloc ranked third, with about 12% of the total, almost all from the USSR and Romania.

WORLD — Crude-Oil Ownership

Area	Total Output (Millions of Tons)	% Shares USA	% Shares British-Dutch
USA and Canada	409	92	5
Latin America	180	57	31
Middle East*	178	50	24
Far East	23	46	53
Western Europe	12	31	9

*These "ownership" figures do not include Iranian production.

Demand is pushing far ahead of anything expected a few years ago; and, despite temporary setbacks during the past two years, production will reach almost astronomical proportions by 1975. The effort which will be needed to meet demand is enormous, and calls for, roughly, double present production levels in about 15 years.

Reserves: Total proved reserves of the world are given in an accompanying table. Only about half of these reserves are recoverable under presently known techniques.

The amount of oil ultimately to be found long has been a matter of conjecture; but known geology justifies a guesstimate, and several such have been made. One by Lees and Ion made in 1952, which excluded Russia, gave the ultimate reserves of *recoverable* oil as 70,000 million tons, equivalent to, roughly, 525 billion barrels. An estimate by Wallace E. Pratt in 1956 gave proved reserves of oil available to the noncommunist world which could be extracted at a realistic cost (up to double the present cost) as about 877.5 billion barrels. This compares with utilization of about seven billion barrels during 1958.

REFINING: The world's refining capacity is growing at a rapid pace. Figures show a 1958 increase of 1,613,900 b d, or 7.8% over 1957.

This expansion follows a threefold increase in capacity outside North America during the past 10 years. In the USA, capacity has expanded much more slowly, but has about doubled. The share of world refining capacity in the USA has also gone down—from about 71% to about 58% at present.

Refinery Yields: There is considerable difference in yields between refineries in the Western and Eastern Hemispheres, as an accompanying table shows.

WORLD — Refinery Yield of Products

Products	North America[1] (% by Weight[3])	Eastern Hemisphere[2] (% by Weight)
Gasolines	48	25
Middle distillates	34	31
Fuel oils	18	44
	100	100

[1]USA and Canada. [2]All Eastern Hemisphere excluding only USSR, Eastern Europe, and China. [3]Yields are expressed by weight instead of by volume, as is more usual in North America, since weight bears a closer relationship to energy content. Source: Paper submitted to World Power Conference by M. E. Hubbard, The British Petroleum Co.

Crude runs to stills in the Free World amounted to 15.2 million barrels per day in 1957, compared with 14.7 million barrels in 1956, an increase of 3.2%. Distribution of the estimated refinery throughput by major areas is detailed in an accompanying table.

WORLD — Estimated Refinery Throughput by Major Areas

Area	1957 (Thousands of Barrels Per Day)	1956 (Thousands of Barrels Per Day)	% Change
United States	7,919	7,937	− 0.2
Caribbean	1,685	1,560	+ 8.0
Canada	655	630	+ 4.0
Mexico	230	220	+ 4.5
Other countries	496	403	+ 23.1
Western Hemisphere	10,985	10,750	+ 2.2
Western Europe	2,315	2,275	+ 1.8
Middle East	900	840	+ 7.1
Far East	870	755	+ 15.2
Other countries (excl. communist)	135	110	+ 22.7
Eastern Hemisphere	4,220	3,980	+ 6.0
WORLD	15,205	14,730	+ 3.2

Free World refining requirements in 1975 are estimated to increase to around 42 million barrels per day. On a rule-of-thumb basis, this would mean new fixed investment charges of about 20 billion current dollars in the next 18 years, or a little over $1 billion per annum.

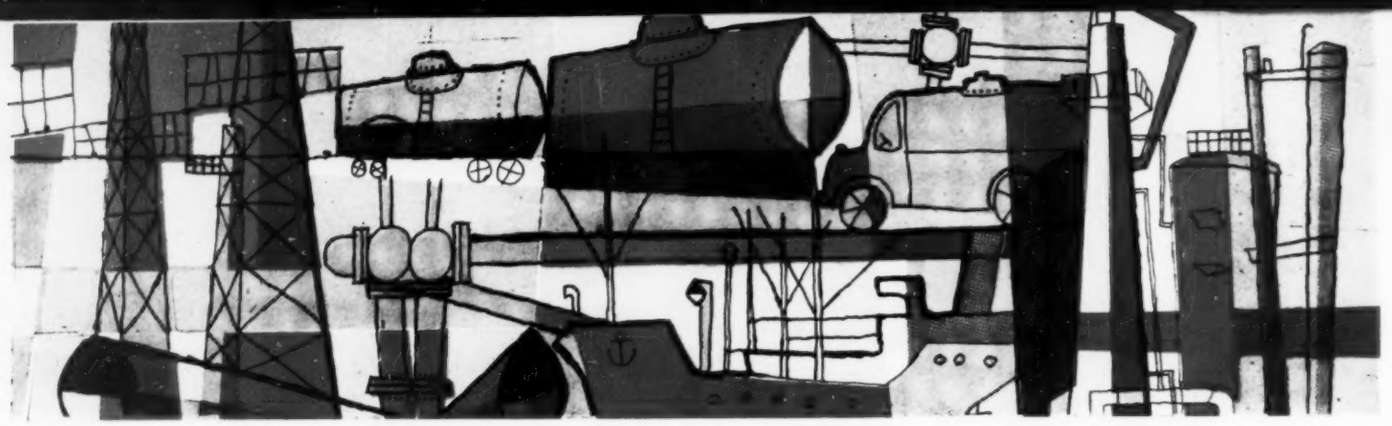
TRANSPORTATION: Major crude pipelines are being considered in Canada, Argentina, Algeria, India, and Turkey. These are supplemented by a number of other projects, as covered under the country sections. There is no useful worldwide tabulation which could be made within the space available to this section.

Tankers: Oil makes up over half of all the world's goods, by weight, which move in international trade, and tankers comprise over one-fourth the world's merchant fleet.

The outstanding trend in the tanker industry has been construction of "super" and "mammoth" tankers. These giants, now the world's largest ships of any kind, have had a distinct impact in many ways, one of them being to reduce the importance of crude supply locations; crude located in areas far from consumption is now made more economically competitive because the new tankers have reduced carrying costs.

At the beginning of 1958, the world tanker fleet of ocean-going vessels (2,000 gross tons and over) totaled 50,424,800 deadweight tons (dwt). During 1957, the gain in carrying capacity was 13%. The size of the ships increased, and for the first time was over that of the T-2 tanker. About

(Continued)



World Functional Division of Major Petroleum Data—Year 1958

(In U.S. Barrels Per Day)

Country	Production[1]	Refining[3] No. of Plants	Refining[3] Crude Capacity (as of 7/1/58)	Refining[3] Cracking Capacity	Consumption[4] (Crude-Equivalent Basis) 1958	Consumption[4] (Crude-Equivalent Basis) 1959 Estimate	Proved[2] Reserves (Millions of Barrels)
Aden		1	120,000	—	75,000	78,000	—
Albania	9,000	2	6,000	—	N.A.	N.A.	N.A.
Algeria (Incl. OCRS)	9,270				34,000	36,000	4,500.0
Angola	1,900	1	2,000	—	N.A.	N.A.	25.0
Argentina	98,000	17	243,670	118,000 TC	261,000	280,000	2,500.0
Australia	NIL	7	205,500	56,500 C	202,000	214,000	NIL
Austria	52,799	8	39,660	11,000 T	44,000	45,000	412.5
Bahrain	40,748	1	186,500	43,320 TC	25,000	26,000	230.0
Belgium and Luxembourg		8	175,100	25,500 TC	133,000	141,000	—
Bolivia	9,379	4	11,900	—	6,000	7,000	90.0
Brazil	51,794	8	111,800	16,400 TC	233,000	255,000	480.0
British Borneo	106,305	1	50,000	—	N.A.	N.A.	300.0
Bulgaria	6,000	1	5,000	—	N.A.	N.A.	N.A.
Burma	8,993	2	6,500	—	8,000	9,000	45.0
Canada	451,425	43	792,120	352,825 TC	765,000	805,000	12,861.4
Chile	14,700	2	26,740	4,500 T	46,000	52,000	50.0
China (Communist)	40,000	6	N.A.	N.A.	N.A.	N.A.	N.A.
Colombia	129,000	5	69,500	39,000 C	53,000	57,000	710.0
Cuba	928	6	84,700	22,900 TC	71,000	83,000	3.0
Czechoslovakia	2,000	4	26,000	—	N.A.	N.A.	N.A.
Denmark		3	980	—	86,000	94,000	—
Ecuador	8,900	2	5,650	—	10,000	11,000	25.0
Egypt	60,423	3	76,200	9,000 T	81,000	84,000	300.0
Finland		1	20,000	11,000 C	35,000	39,000	—
France	27,912	15	673,700	135,400 TC	493,000	534,000	175.0
Gabon (and Middle Congo)	9,363				N.A.	N.A.	37.5
Germany (West)	85,772	27	415,000	80,300 TC	436,000	506,000	479.5
Germany (East)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Greece		1	27,000	—	38,000	40,000	—
Hawaii (incl. Alaska)		1	3,000	—	48,000	50,000	—
Hungary	17,965	5	34,000	—	N.A.	N.A.	N.A.
India	8,900	4	104,500	29,600 TC	140,000	151,000	300.0
Indonesia	310,000	5	242,800	74,000 TC	91,000	97,000	8,500.0
Iran	822,000	3	415,000	27,000 C	114,000	130,000	31,000.0
Iraq	725,426	4	45,630	18,000 T	36,000	40,000	25,000.0
Israel	2,700	1	87,000	23,500 T	35,000	37,000	50.0
Italy (and Sicily)	32,000	35	604,000	60,665 TC	338,000	367,000	300.0
Japan	7,252	23	503,560	42,850 TC	334,000	377,000	21.5
Kuwait	1,399,385	1	190,000	—	72,000	82,000	58,000.0
Lebanon		2	20,500	—	15,000	17,000	—
Libya					N.A.	N.A.	50.0
Mexico	264,940	8	319,000	46,500 TC	276,000	289,000	2,500.0
Morocco	1,532	1	2,400	1,400 C	20,000	21,000	6.7
Netherlands	30,135	2	364,000	95,000 TC	191,000	204,000	123.0
Netherlands West Indies		2	650,000	213,000 TC	N.A.	N.A.	—
New Guinea	4,800				N.A.	N.A.	30.0
New Zealand	NIL				N.A.	N.A.	NIL
Neutral Zone	81,631	1	80,000	—	N.A.	N.A.	13,500.0
Nigeria	6,000				10,000	11,000	25.0
Norway		1	2,100	—	54,000	57,000	—
Pakistan	5,400	1	7,500	—	40,000	41,000	200.0
Peru	51,312	3	46,000	14,500 T	47,000	51,000	325.0
Philippines		1	13,000	5,400 C	49,000	53,000	—
Poland	3,614	5	15,000	—	N.A.	N.A.	N.A.
Portugal and Islands		1	22,900	10,000 C	30,000	40,000	—
Puerto Rico		2	65,500	32,000 C	37,000	40,000	—
Qatar	173,586	1	600	—	2,000	2,000	1,425.0
Romania	248,900	15	240,000	—	N.A.	N.A.	N.A.
Saudi Arabia	1,015,000	1	189,000	—	59,000	62,000	35,000.0
South Africa		2	23,000	12,000 TC	95,000	102,000	—
Spain		3	150,700	3,500 T	89,000	95,000	—
Sweden		5	50,700	1,000 T	211,000	223,000	—
Switzerland		2	1,350	—	57,000	64,000	—
Syria					N.A.	N.A.	1.0
Taiwan (Formosa)	Nil	1	28,000	10,000 TC	14,000	16,000	N.A.
Trinidad and Tobago	101,400	3	142,000	54,500 TC	36,000	36,000	400.0
Turkey	6,164	1	7,160	3,580 C	33,000	35,000	52.5
United Kingdom	1,587	16	778,400	127,300 TC	765,000	859,000	7.0
USSR	2,960,000	70	1,950,000	600,000 TC	2,460,000	2,693,700	24,000.0
United States	6,707,000	298	9,186,000	6,400,000 TC	9,027,000	9,408,000	33,300.0
Uruguay		1	28,000	7,000 TC	30,000	32,000	—
Venezuela	2,609,700	15	791,370	118,460 TC	149,000	165,000	16,500.0
Yugoslavia	9,000	3	22,700	6,400 TC	21,000	23,000	52.5
Totals	18,158,940	728	20,807,590	8,962,800	19,084,000	20,298,700	264,393.1

Production: Tabulation includes all countries which have any significant production of crude petroleum. Figures given in U.S. barrels of 42 gallons. For conversion to total barrels, multiply by 365. For rough conversion to total metric tons produced during the **entire year**, multiply by 50. Those countries which do not show any production did not produce oil in 1958; they are included only because they have refining facilities.

Reserves: Figures are for proved reserves as of January 1, 1959, or as close thereto as possible. For exact dating of reserve figure, see the appropriate country section. Figures are in millions of U.S. barrels of 42 gallons. For approximate reserve figure in millions of metric tons, divide by 7.5. It should be kept in mind that these figures represent proved reserves of oil in place, of which about 50%, is recoverable under present-day techniques and price levels.

[3]Refinery data were compiled in mid-1958 but corrected to year's end. For more details on plants, see the appropriate country section. USSR data are estimated, as are data on other communist nations. Capacities given are in barrels per calendar day. Under Cracking Capacity to indicate type: T - Thermal, C - Catalytic.

All data except number of plants are given in U.S. barrels per day. For persons not familiar with refinery processes, the crude capacity represents the amount of crude which can be run through the refinery; the cracking capacity should **not** be added to it to obtain total capacity.

[4]Crude-equivalent most closely represents the total use of crude petroleum. The same system is used for all countries to arrive at their crude-equivalent figure, but different countries require different applications of it. For example, in the case of a country which has no refining, the crude-equivalent figure is imports of products with no change (except, to put the figures on the same basis for processing by IBM machine, the marketing allowance is added and subtracted after processing). In the case of a country having internal refining, the crude-equivalent figure is actual consumption as derived from sales reports, to which is added 7% of refinery runs consumed within the country. This 7% allowance is for refinery losses, etc. In addition, the sales figure is increased by 1% for all products except fuel oil sales, and by 9% for fuel oil sales. This is a marketing allowance for losses during sales. The world total, generally speaking, on a crude equivalent basis, is 7% higher than actual consumption of products, since practically all products must be refined before they are consumed. Although only major countries are given in the table, all other countries are included in the total to give the world total.

Note: Since not all countries of the world are included in the above listings, all remaining countries **have** been added and the total given includes them, including military demand.

N.A.—Not available.

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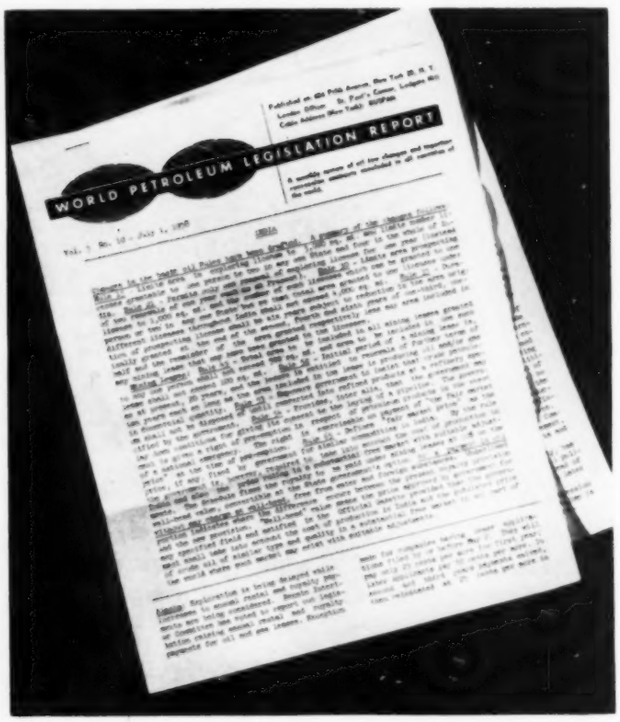

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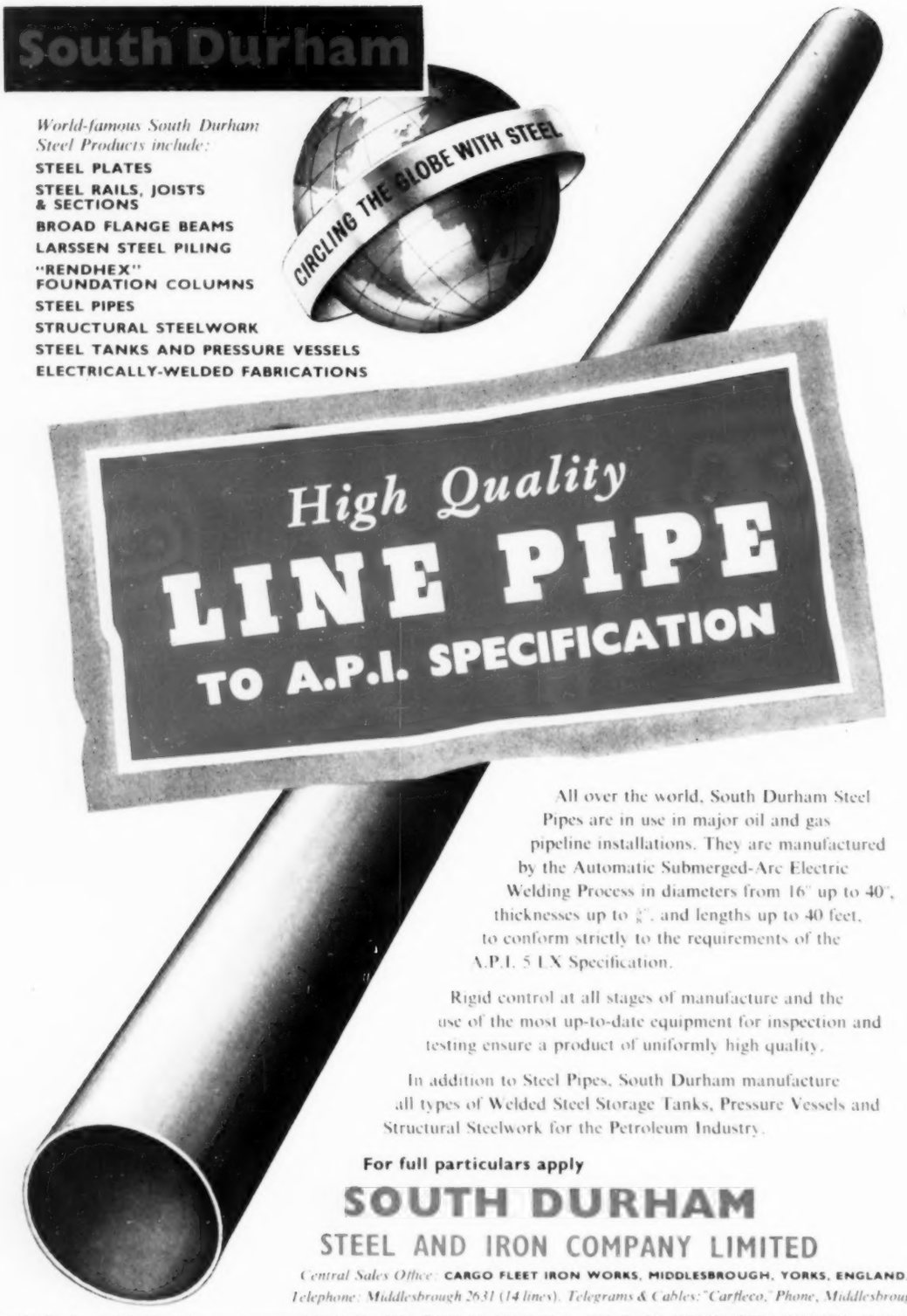

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WORLD *(continued)*

83.5% of the carrying capacity was able to transit the Suez Canal. Only 5% of it will be able to transit the St. Lawrence Seaway when it is finished this year (1959). The fleet was owned 32.4% by oil companies, 58.6% by nonoil companies, and 9% by governments. At the same time (January 1, 1958) about 37.4 million dwt in 1,116 ships was on order. By October 1, 1958, these orders had decreased to 30,103,788 dwt. Nevertheless, the size of the world's tanker fleet had increased to 50,669,123 dwt by October 1, 1958. This flush construction is the result of orders placed during the Suez crisis. Recently there have been more cancellations than orders.

WORLD — Percentage Distribution of Crude Production

Principal Countries	1958	1957	1956
United States	37.0	40.4	43.2
Venezuela	14.4	15.8	14.7
USSR	12.6	13.2	9.5
Kuwait	7.6	6.5	6.5
Saudi Arabia	5.6	5.7	6.0
Iran	4.7	4.0	3.3
Iraq	4.0	2.3	3.9
Canada	2.5	2.9	2.8
Indonesia	1.8	1.8	1.5
Mexico	1.4	1.4	1.5
Romania	1.3	1.2	1.3
Borneo	0.7	0.7	0.7
Principal Areas			
North America	40.9	44.6	47.5
South America	17.0	18.1	17.0
Western Hemisphere	57.9	62.7	64.5
Europe (inc. USSR)	13.8	14.5	12.5
Middle East	23.8	20.0	20.5
Asia and Australasia	2.9	2.8	2.5
Eastern Hemisphere	42.1	37.3	35.5

MARKETING: Potential growth foreseen in world oil consumption during the coming two decades is staggering, as shown in estimates contained in *World Petroleum Report—1958* (p. 16 and 22). An accompanying table indicates the rate of growth, and shows the much slower growth rate occurring in the United States.

By 1966, Free World demand outside the USA will almost equal the demand of the United States. Free World demand has experienced an average annual increase of 11.1% during the post-World War II period, and the annual increase is expected to average, conservatively, 7.7% during the coming seven years. This contrasts with the expected 5% annual gain forecast for the USA during the coming seven years.

1958 Consumption: Of more immediate concern is the outlook for 1959 and the record of 1958. World oil demand is estimated to have risen to 19,084,000 b/d of crude-equivalent, an increase of 6.1%, during 1958. In 1957, demand rose about 6.8%, while in 1956 it rose 8.2%. The Western Hemisphere continues to show a slower rate of increase than the Eastern, 2.3% compared with 12.1% in the Eastern. 1958 levels are shown in accompanying tables.

Financial Requirements: An enormous amount of capital is needed to finance this oil expansion, but oil produces a correspondingly large share of the world's mineral output by value. A study by the German Institute of Economic Research, in West Berlin, indicates the world's production of all minerals, in terms of value, reached an estimated $41,964 million in 1956, of which petroleum and natural gas accounted for 42%.

An estimate compiled during late 1958* gave the colossal combined gross investment in fixed assets of the international oil industry as $80 billion at year-end 1957. Capital expenditures in 1957 were estimated at $11 billion, an increase of 12% over 1956. Based on an estimated expansion of demand to 14.4 million barrels per day in the United States by 1967 (about 63% over 1957) and an expansion of 111% in the remainder of the Free World to 15.1 million barrels daily, the estimated capital needed to support this expansion in supply and demand for the 10-year period 1958-67 amounts to $77 million for the United States and $63 million for other countries, making a combined outlay of $140 million for the entire noncommunist world. A large portion of these expenditures will continue to be financed by funds generated internally from the operations of the industry.

1959 Demand: During 1959, the industry is expected to resume its active upward climb. The increase in United States demand is estimated to be in the neighborhood of 4% or better; the remainder of the noncommunist world is estimated to increase by approximately 11%.

Rates of growth anticipated by A. Cadle, Standard Oil Co. of California, from 1957 to 1975, are shown in an accompanying table.

WORLD — Free World Petroleum Demand

Area	1956 (Thousands	1961 of Barrels	1966 Per Day)
United States	8,757	11,200	14,300
Free World outside USA	6,793	9,825	14,200
Total Free World	15,550	21,025	28,500

Source: Chase Manhattan Bank.

WORLD — Percentage Increase in Oil-Product Demand, 1957-1975

	Motor Gasoline	Distillates	Fuel Oil
United States	100	47	46
Western Europe	178	234	259
Western Hemisphere (ex. USA)	195	182	135
Eastern Hemisphere (ex. Western Europe)	214	226	202

Rise in Natural-Gas Use: Use of natural gas is rising rapidly. Although gas and oil are frequently found together, and one is often found while looking for the other, they are considered by the oil industry as completely different and competing. As such, gas threatens to take a large amount of the available capital away from the oil search.

Consumption of natural gas in the Free World outside the United States, excluding gas reinjected into oil-producing reservoirs, has increased almost 3½ times since 1950, to about 2,200 million cubic feet per day in 1957. In the communist countries, a roughly similar overall increase has taken place—to about 2,500 million cubic feet daily from around 790 million. The United States, however, continues to represent the bulk of the world's consumption of natural gas. USA marketed production of gas has increased from 1950 by two-thirds, to 29,000 million cubic feet daily in 1957, when it accounted for about 93% of total natural-gas consumption in the Free World, and 86% of the total in the world as a whole.

Atomic Power: There has been considerable speculation on the impact of atomic power on the oil industry. In an industry as new and unpredictable as atomics, it is impossible to anticipate what new development may suddenly come on the scene. However, based on what is known at present, the impact on oil should not be great. The atom and oil together will find it hard to meet the estimated energy demand, much less find themselves competing for the same market. The most likely place for the atomic share to grow is the United States, where atomics are already highly developed.

* Financial Requirements of the World Petroleum Industry, Chase Manhattan Bank.

WORLD — Forecast of Petroleum Expenditures

	1958-1962	1963-1967	Combined	1958-1962	1963-1967
	Million Dollars			Percent of Total	
United States					
Production °	24,625	30,000	54,625	71	70
Refineries and Chemical Plants	5,000	6,250	11,250	15	15
Transportation and Marketing	4,875	6,250	11,125	14	15
Total	34,500	42,500	77,000	100	100
Other Noncommunist					
Production °	11,600	17,100	28,700	42	48
Refineries and Chemical Plants	6,125	7,500	13,625	22	21
Transportation and Marketing	9,775	10,900	20,675	36	31
Total	27,500	35,500	63,000	100	100
Grand Total	62,000	78,000	140,000	—	—

° Includes natural-gasoline and cycling plants
Source: Chase Manhattan Bank.

OIL LAWS

The discussion in this section concerns recent trends in oil laws and concession contracts. A systematic effort has been made by this office over a number of years to assemble the original text of most oil laws and concession contracts of the world. These have now been assembled and translated. They are kept on file for all countries of the world in the original, complete version. For information regarding same, write to *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y. (see p. 22 herein).

New Oil Laws: During 1958, new oil laws of importance were passed in Algeria, Spain, Nicaragua, Argentina, Morocco, Cuba, Sierra Leone, Venezuela (actually a change in income-tax rates), Alaska (now subject to USA law), and Syria. 1959 will produce an even larger crop. Nigeria's new oil law was passed early this year. Important changes are pending in Chile, Paraguay, Colombia, Panama, Costa Rica, Honduras, El Salvador, Haiti, Somaliland Protectorate, Italy, Saudi Arabia, Pakistan, Afghanistan, Burma, India, Philippines, Indonesia, and Australia, to mention only the principal ones.

Changes in Concession Terms: Three important aspects of oil laws and new concessions came to the fore in 1958. They entail: (1) efforts to force companies to integrate their operations forward into transportation, refining, and distribution (even outside the host country); (2) changes from the traditional financial arrangements away from the 50-50 profits division; and (3) conclusion of new performance contracts rather than conventional concession agreements for international oil companies.

Integration: Some oil-producing countries are extending their interest in the oil business beyond production—to transportation, refining, and marketing. An increase in local refining, for example, would provide employment and give rise to ancillary businesses, both of benefit to the local economy. Interest in tanker transportation and distribution demonstrates a growing awareness of the importance of access to world markets. Furthermore, it may also be noted that, under conditions of a world surplus of oil, crude-oil prices would be presumed to reveal weakness. If this happened, the refining and marketing phases of the oil business would tend to absorb a growing share of integrated profits.

Break with 50-50: Venezuela led the way in

WORLD — ESTIMATED DOMESTIC DEMAND FOR MAJOR PRODUCTS, 1957
(Thousands of Barrels)

Country	Motor Fuel	Kerosine	Distillate Fuel Oil	Residual Fuel Oil	Lubricants	Total[1]
NORTH AMERICA and CARIBBEAN						
Alaska and Hawaii	6,890	140	3,100	8,200	140	18,470
Canada	90,152	14,608	69,587	55,130	3,190	232,667
Costa Rica	450	60	400	170	30	1,110
Cuba	5,980	1,160	4,550	14,400	300	26,390
Dominica	790	70	400	1,000	60	2,320
Guatemala	900	140	370	950	45	2,405
Haiti	300	20	200	190	11	721
Honduras, British	50	15	30	—	5	100
Jamaica	662	183	891	2,553	26	4,315
Mexico	25,845	9,480	10,820	34,200	1,075	81,420
Nicaragua	470	40	430	160	15	1,115
Panama, Canal Zone	450	30	2,950	4,940	15	8,385
Panama, Republic	790	190	380	650	20	2,030
Puerto Rico	5,080	820	1,300	5,820	70	13,090
El Salvador	618	165	157	302	24	1,266
Trinidad	1,431	217	3,150	9,130	45	13,973
United States	1,392,953	107,701	616,090	548,801	41,215	2,706,760
TOTAL ABOVE	1,533,811	135,039	714,805	686,596	46,286	3,116,537
SOUTH AMERICA						
Argentina	15,529	8,885	14,987	45,113	1,194	85,708
Bolivia	811	270	379	715	37	2,212
Brazil	25,194	4,354	12,201	27,500	1,196	70,445
British Guiana	150	100	248	704	20	1,222
Chile	3,885	1,210	2,778	6,070	172	14,115
Colombia	7,627	1,664	2,488	4,339	242	16,360
Ecuador	1,280	230	500	1,000	40	3,050
Paraguay	280	80	101	94	14	569
Peru	5,991	2,241	2,961	3,748	80	15,021
Uruguay	2,270	1,260	1,750	5,130	90	10,500
Venezuela	13,411	3,262	9,188	24,781	525	51,167
TOTAL ABOVE	76,428	23,556	47,581	119,194	3,610	270,369
WESTERN EUROPE						
Austria	3,391	131	2,618	6,533	567	13,240
Belgium	10,000	550	12,783	18,000	707	42,040
Denmark	6,205	890	7,440	11,570	350	26,455
Finland	4,000	600	3,600	4,500	200	12,900
France	39,645	749	29,851	57,090	3,515	130,850
Germany, western	31,756	385	30,436	42,663	3,591	108,831
Greece	2,100	800	3,600	5,200	120	11,820
Iceland	550	40	800	1,000	30	2,420
Ireland (Eire)	2,800	750	1,300	2,500	120	7,470
Italy and Trieste	13,600	1,194	15,472	55,270	1,414	86,950
Netherlands	9,877	2,400	14,061	25,177	1,100	52,615
Norway	3,655	1,100	7,620	9,890	300	22,565
Portugal	2,004	1,070	2,708	3,910	170	9,862
Spain	6,444	1,590	5,636	14,054	610	28,334
Sweden	10,907	1,570	23,372	27,100	800	63,749
Switzerland	5,831	560	9,989	3,317	375	20,072
United Kingdom	66,028	10,354	37,621	81,852	5,873	201,728
TOTAL ABOVE	218,793	24,733	208,907	369,626	19,842	841,901
MIDDLE EAST						
Bahrain	420	176	1,338	3,669	10	5,613
Iraq	1,736	1,840	2,075	4,760	120	10,531
Israel	1,408	1,100	1,649	5,500	100	9,757
Jordan	320	270	320	70	20	1,000
Kuwait	823	175	757	11,880	40	13,675
Lebanon	1,290	350	870	2,290	90	4,890
Saudi Arabia	1,610	363	2,227	10,895	25	15,120
Syria	800	550	2,000	1,000	80	4,430
Turkey	3,150	2,129	3,690	980	360	10,309
TOTAL ABOVE	11,557	6,953	14,926	41,044	845	75,325
ASIA						
Afghanistan	118	13	63	—	4	198
Burma	1,000	400	600	300	100	2,400
Cambodia and S. Viet Nam	1,900	500	700	600	70	3,770
Ceylon	1,600	900	1,900	5,500	70	9,970
Formosa	1,500	250	800	1,900	100	4,550
India	8,700	13,800	9,000	9,000	1,700	42,200
Japan	23,395	7,196	18,700	52,950	3,545	105,696
Malaya	2,900	900	5,900	16,000	200	26,700
Pakistan	2,000	1,550	3,400	6,300	250	13,500
Thailand	2,400	670	2,050	1,250	200	6,570
TOTAL ABOVE	45,513	26,179	43,113	94,600	6,149	215,554
AFRICA						
Algeria	2,168	541	1,800	1,600	148	6,257
Angola	450	70	430	200	50	1,200
Belgian Congo	1,910	260	1,100	220	160	3,650
Egypt	2,700	5,500	3,800	13,800	270	26,070
Ethiopia	530	30	100[2]	N.A.	40	700
Fr. Equator. Africa	520	95	330[2]	N.A.	40	985
Ghana	1,200	300	850	300	80	2,730
Kenya	1,081	328	4,956[2]	N.A.	59	6,424
Liberia	160	30	50	—	10	250
Madagascar	490	100	220	20	45	875
Morocco	2,230	350	950	1,230	50	4,810
Nigeria	2,130	650	800	250	100	3,930
Rhodesia and Nyasaland	2,098	291	950[2]	N.A.	156	3,495
Sudan	770	210	490	970	50	2,490
Tanganyika	550	190	500	550	40	1,830
Tunisia	646	271	843	1,295	48	3,103
Uganda	523	156	206	75	26	986
Union So. Africa	12,978	4,055	6,116	7,324	787	31,260
West Africa, French	2,050	495	3,800	9,150	100	15,595
TOTAL ABOVE	35,184	13,922	28,291	36,984	2,259	116,640
OCEANIA						
Australia	29,798	3,392	11,210	17,544	1,400	63,344
Indonesia	5,626	7,478	4,823	6,461	293	24,681
New Caledonia	140	30	240[2]	N.A.	15	425
New Zealand	7,450	250	2,290	2,480	300	12,770
Philippines	6,232	1,573	3,597	3,477	270	15,149
TOTAL ABOVE	49,246	12,723	22,160	29,962	2,278	116,369
TOTAL ABOVE COUNTRIES	1,970,532	243,105	1,079,783	1,378,006	81,269	4,752,695
Daily Average	5,399	666	2,958	3,775	223	13,021

N.A. - Not available. [1]Data on domestic demand for aviation jet fuel is known for the following countries: Italy, 990,000 barrels; Canada, 4,393,000 barrels; United States, 72,961,000 barrels; Venezuela, 74,000 barrels; France (civilian only), 810,000 barrels; Australia, 821,000 barrels. Separate data for other countries is not available; it is not known whether jet fuel is included among the other product breakdown or not. [2]May include unreported amount of residual fuel oil. Source: U.S. Bureau of Mines. Note that these figures are actual amounts, not crude-equivalent basis as used in the 1958 consumption figures given in separate tables.

1958 with a break from the traditional 50-50 concept and, by an income-tax increase, brought the government's share to over 60%. This is before foreign taxes, of course. This method of receiving an increased share is very different from that of Iran, where new agreements involve the admittance of an arm of the government (i.e. National Iranian Oil Co.) into participation in the concession. The government can thus share in management decisions, and it will also be obliged to meet its proportion of all development expenditures, which could well entail large sums.

The danger in changing the government-company ratio involves the fact that ultimately a ceiling exists on the level to which governments can raise their revenues without discouraging investments. The ceiling is established by the return on investment which can be obtained on oil production in the United States and Canada, plus some consideration for the risks of doing business outside North America. Obviously, USA oil companies would not be attracted to oil-producing operations outside North America if earnings were virtually equivalent to those at home. As this ceiling is approached, new investment abroad is likely to become increasingly sensitive to government requirements. Tax and other financial provisions of concession arrangements are likely to be subjected to refined and detailed negotiation.

Performance Contracts (Argentina): The 1958 Argentine exploration and production contracts (with the exception of the Royal Dutch-Shell arrangement, which appears to work out in line with conventional 50-50 agreements) provide unique departures from existing international oil arrangements. The contracts are essentially a guarantee to perform sevices, i.e., drilling and exploration work. The contracting party assumes all risks. The government retains full title to oil found, and pays a fee to the contractor, partly in local currency and partly in hard currency.

The acceptance of these contracts (by both international and USA domestic companies) has been so widespread that the question is raised whether such contracts may find wider application in other countries. The answer, of course, lies partly in the fact that the contracts apply mainly to semideveloped oil areas. The contract which corresponds most closely to conventional 50-50 agreements (that of Royal Dutch-Shell) covers exploratory work in hitherto unexamined territories. None the less, precedents have been established in Agentina which other countries may try to follow.

NATIONAL FACTORS

Economy: The world's economy seems headed upward again and, with it, the growth rate for oil consumption. There are excellent reasons for presuming 1959 will be a good year. The most recent hopeful sign is the relaxation of exchange control regulations in Western Europe adopted during December 1958. It is indicative of the great force and vigor of those countries' economies, due in part to the Marshall Plan. Another factor is the recovery of business in the United States, where the recession appears to have reached its bottom and the economy once more is on the way up. The third is the improved prospect of an end to the commodity price decline through a better inventory-demand relationship.

Government-Company Relations: A stabilizing factor is the growing number of responsible government officials whose technical and managerial experience in oil equals that of company personnel. This balancing of abilities has always been salutary, leading to more harmonious relations from better understanding of one another's problems.

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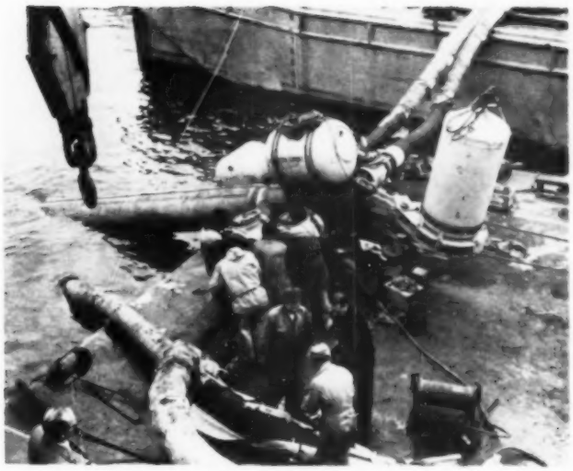

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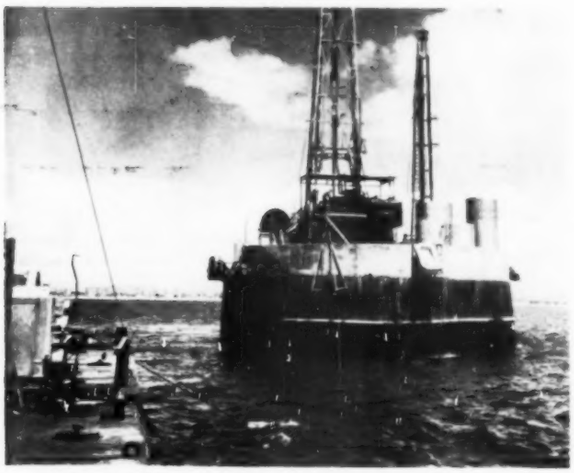

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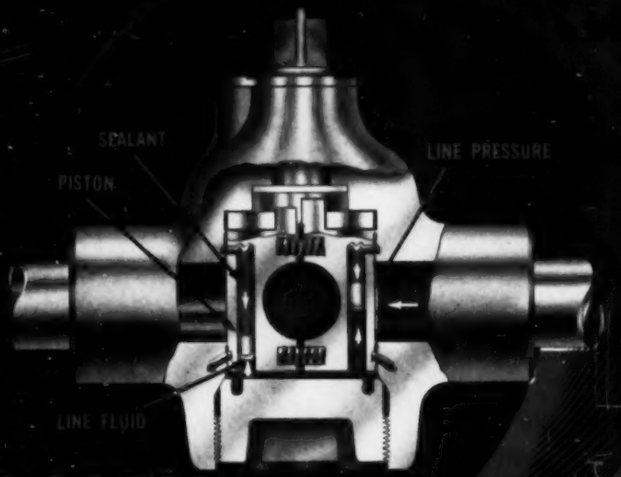

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MIDDLE EAST

This section is a brief review of regional activities. For details, see reviews of individual Middle East countries following.

PHYSICAL DEVELOPMENT

EXPLORATION: An estimated 240 wells were drilled during 1958 in the Middle East, but only a small number of these were exploratory. Significant developments were the granting of offshore concessions in Iran and the Neutral Zone. Discoveries of note were made in Saudi Arabia and off Das Island (Abu Dhabi sheikdom), especially the latter which, for the first time, established commercial oil production south of Qatar.

PRODUCTION: During 1958 production rose to 4,185,009 b/d, almost 16% over 1957.

MIDDLE EAST — Crude-Oil Production, 1958

Country	Barrels Per Day
Bahrain	40,748*
Iran	822,000
Iraq	725,426
Israel	2,700*
Kuwait	1,399,385
Qatar	173,586
Saudi Arabia	1,015,000
Syria	Nil
Turkey	6,164*
Total	4,185,009

*Estimated.

REFINING: Two new refineries, both in the Neutral Zone, were completed during 1958, raising capacity to 1,313,730 b/d. New refineries are planned or under way in Syria, Jordan, and Iran.

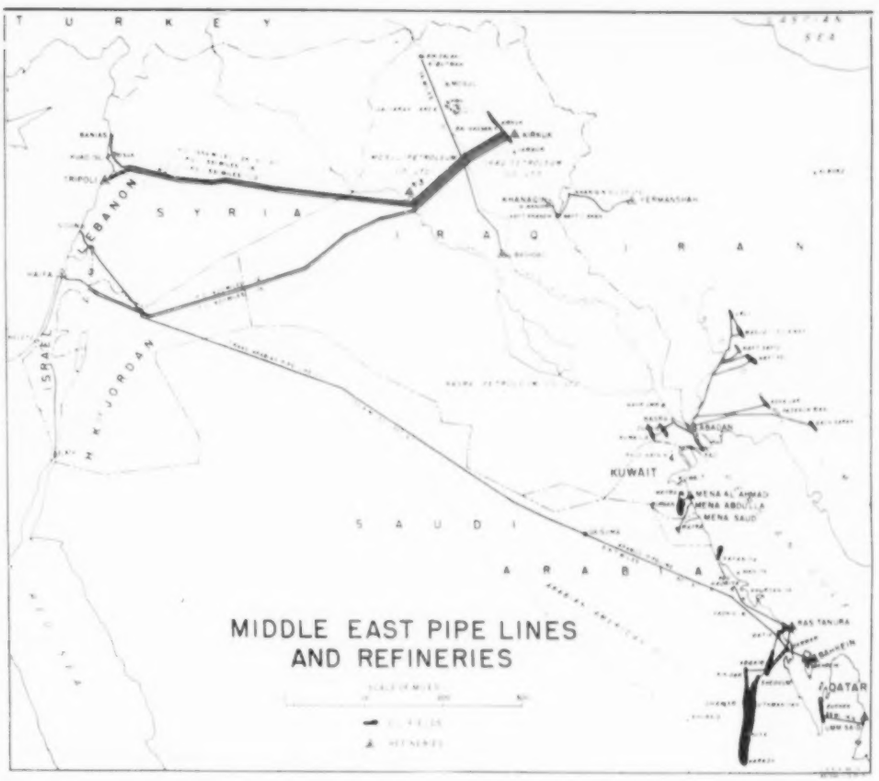
MIDDLE EAST — Refineries
(As of July 1, 1958)

Country	No. of Plants	Crude Capacity	Cracking Capacity
		(Barrels Per Calendar Day)	
Aden	1	120,000	—
Bahrain Island	1	186,500	43,320 TC
Iran	3	415,000	27,000 C
Iraq	4	45,630	18,000 T
Israel	1	87,000	23,500 T
Kuwait	1	190,000	—
Neutral Zone	2	80,000	—
Qatar	1	600	—
Saudi Arabia	1	189,000	—
Total	15	1,313,730	111,820

T - Thermal. C - Catalytic.

TRANSPORTATION: No major pipeline arteries were completed during 1958, and none is known to be under consideration—although extensive additions are under way in Iraq. The proposed 500,000 b/d line, under consideration by a group of major oil companies, from the Persian Gulf to Turkey was dropped early in 1958. Consideration of the line came up again in the form of a treaty between Iran and Turkey, but that is still in a rudimentary stage.

MARKETING: The total of Middle Eastern production was exported, with the exception of an estimated 10% which was consumed within the area. Destinations of exports are given in the appropriate country summaries wherever such information is available.



Crude Price Change: A change of major importance took place, February 13, 1959, when British Petroleum Co. announced a decrease of 18 cents per barrel on all its crude posted prices in the Middle East. Prices declined to the levels indicated in the accompanying table, with other world prices given for contrast.

WORLD CRUDE-OIL PRICES
(As of Feb. 13, 1959)

	Gravity (Deg API)	US $/Bbl
United States		
East Texas	37	3.05
Canada		
Redwater (Alberta)	40	2.84[1]
Venezuela		
Tia Juana (Creole)	31—31.9	2.65
Quiriquire (Creole)	16—16.4	2.15
Saudi Arabia[2]	34—34.9	2.08
Saudi Arabia[3]	35—36.9	2.49
Qatar (ex Umm Said)[4]	40—40.9	2.03
Kuwait (ex Mina al Ahmadi)	31—31.9	2.67
Iran (ex Abadan)	34—34.9	1.81

[1] Canadian dollars. [2] Ex Ras Tanura. [3] Ex Sidon. [4] BP posted prices (Kuwait and Iran are also BP).

OIL LAWS*

Controlling Statutes: The national sections of this report list the governing regulation of oil in the Middle East. Most of this regulation has been translated and placed on file at the New York offices of *World Petroleum Report* and affiliated publications. Separate sections have been prepared for each country and, in addition, a single volume consolidating all the laws and concessions has been prepared.

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

Arab nationalism and communism have become the basic issues on which future security of the international oil industry in the Middle East depends. The oil companies themselves have little to say on the subject; involved in the countries as they are, their only course is to keep as neutral as possible. However, some central facts emerge: (1) Arab nationalism, which takes many of its ideals from the American example of democracy, is personified for the Arab world by President Nasser, who is the ideal of the Arab countries now, whatever their other dissensions may be. (2) Communism is definitely on the rise. It is believed the union of Syria and Egypt was accomplished with the full consent and wholehearted support of Syrian nationalists to forestall a communist coup. The same situation is now developing in Iraq. The new leader in Iraq, Kassem, is relying on communist support, mainly from the Kurdish tribes. Communist leaders known to have taken part in the Russian invasion of Iran just after World War II are on the scene and attempting to infiltrate the government.

Should Kassem not be able to prevent his communist allies from infiltrating his government, he may be forced to accept union with Egypt, Syria, and the Yemen in order to resist communist encroachment.

ADEN

PHYSICAL DEVELOPMENT

EXPLORATION: Aden is composed of two parts: Aden Colony and Aden Protectorate—as covered in the *World Petroleum Report—1957*—where may be found a description of geology.*

Geological and seismograph surveys were carried out by BP Exploration Co. Ltd. in the Kamaran Islands and in Hadhramaut, which consists of about 25 sheikdoms known as Aden Protectorate, by Petroleum Concessions (Hadhramaut) Ltd., an affiliate of Iraq Petroleum Co. Ltd.

No information is available on 1958 operations. An oil discovery was denied, and the company stated no drilling had been done in the area as yet.

PRODUCTION, REFINING: There is no production in Aden. There is a large refinery at Aden Colony, which has 120,000 b d capacity, with 12,000 b d catalytic reforming capacity and 12,000 b d thermal reforming, the latter added during 1958. A detailed review of facilities is contained in *World Petroleum Report—1957*.

Refinery production during the first six months of 1958 was as follows:

	Thousands of Long Tons
Motor and other gasolines	298.7
Kerosines	157
Gas-diesel oils	357.5
Fuel oils	904.7
Total	1,717.9
	(66,073 b d, approx.)

TRANSPORTATION: Work started about June 1958 on a 20-mile pipeline which will carry up to 15,000 tons a year of fuel gas from the refinery to the Aden Electricity Department's power station at Hedjuff. The new pipeline is the third to link the BP refinery at Little Aden with the town of Aden. Two pipelines, one 16-in., the other 6-in. in diameter, have been carrying fuel and gas oil from Little Aden to the BP bunkering installation at Aden since the refinery was commissioned in 1954. Saboteurs made an unsuccessful attempt on May 14 to blow up one of the pipelines connecting the refinery to company installations in Aden town.

CONSUMPTION: The use of oil in Aden Protectorate is very slight, but Aden Colony uses appreciable amounts, as shown in accompanying table.

ADEN—Oil Consumption, 1957

Product	Sales in Long Tons (2,240 Lb) Colony	Protectorate
Lubricating oil	4,625	138
Gas oil	2,822	1,812
Diesel oil	574	16
Furnace oil	10,557	—
Bitumen	392	—
Aviation gasoline	5,860	—
Kerosine	5,255	1,504
Aviation turbine fuel	139	—
Gasoline	9,329	4,235
Fuel oil	2,638	258
TOTAL	42,191	7,963
Total (b/d approx.)	844	159

Figures include all sales except marine fuels to ships in Aden port and sales to military forces. During 1957 an estimated 500 tons of gasoline and other products were purchased in the colony and exported to both the protectorate and Yemen. Sales in the colony should be lowered slightly, protectorate figures may be raised slightly for the same reason.

OIL LAWS

Oil in the colony is governed by Chap. 96 of the Ordinances, as covered in *World Petroleum Report—1957*. It contains only summary regulations. No details of the exploration licenses which petroleum concessions hold over the Hadhramaut are available.

NATIONAL FACTORS

Considerable unrest has been prevalent in Aden Colony and Protectorate for some time. The British are in firm control, however, despite recurring friction with Yemen along the Yemen-Aden borders.

Riots occurred two years ago in Aden Colony due to labor unrest, and at present the Aden Trade Unions Congress is making demands for wage increases. END

* For information on Aden geology see the following:

G. M. Kees—"The Geology of Tectonics of Oman and Parts of Southeastern Arabia," *Quarterly Journal of the Geological Society* (of London); vol. 84, part 4, p. 585-670; 1928.

W. E. Baker & F. R. Henson—"Geological Conditions of Oil Occurrences in the Middle East Fields, to 12/28/51" American Assn. of Petroleum Geologists Bulletin, vol. 36, no. 10, p. 1885-1902, Oct. 1952.

AFGHANISTAN

PHYSICAL DEVELOPMENT

EXPLORATION: There are no areas under concession for exploration, but the country may open up soon with passage of a new oil law. Meanwhile, drilling is being conducted by a Swedish company on a structure known as the Shebargen anticline at Sar-i-Pul, northern Afghanistan, under contract to the government. Two wells have been drilled, and a third is now drilling. The first test, drilled at Sar-i-Pul in 1956, reportedly had oil and gas shows. The second, same location, was suspended March 29, 1958 at 3,675 ft due to technical difficulties. Results were "hopeful." A third test was begun in August 1958. All these wells have been in a Cretaceous-Tertiary basin which lies north of the Hindu Kush mountains and continues northward across the border into the USSR. The Russians are reported to have at least one, and possibly more, oil fields on their side of the border, but their size is unknown.

Although the Shebargen anticline is not the only anticline on the Afghan side of the border which may have gas or oil potential, it is the only one which has been tested.

Economic Assistance: From the USSR, a 4-year loan was advanced for $10 million for oil exploration in this same basin. Details of the agreement, signed in January 1958, are not available. Czech technicians had arrived by the spring of 1958. Under the agreement, a geological and aerial photography survey will be carried out.

Little previous exploration work has been done. In 1938, Island Exploration Co., an American firm, relinquished a concession between the Hindu Kush mountains and the Russian frontier. Extensive surface geological work indicated a favorable environment for oil accumulation, but it was concluded that costs to move any oil found to markets would be prohibitive. Particularly discouraging was a stipulation by the Afghan government that any pipeline would have to be built through Iran, not through India.

PRODUCTION, REFINING, MARKETING: There is neither production nor refining in Afghanistan. Consumption is not known, but is estimated at approximately 1,200 b d.

Russia is the largest single source of oil imports, supplying an estimated 70% of Afghanistan's gasoline.

OIL LAWS

The oil laws of Afghanistan have been revised, and a new oil law is currently under consideration. Two advisors, Dr. Ralph L. Miller from the US Geological Survey, and David Cerkel assisted the government until about May 20, 1958. No details of the proposed law have been released.

NATIONAL FACTORS

The extreme natural isolation of Afghanistan, symbolized by the watch on the Kyber Pass, has caused a basic distrust of foreigners. To combat it, both the USA and the USSR have granted large foreign aid to the country, which lies in a strategic position with a common 700-mile border with Russia. Aid from both sides in the past seven years has attracted some $284 million, about $24 per Afghan, equal to nearly half his average yearly income.

On January 28, 1956, Afghanistan signed an agreement for the utilization of a $100 million Soviet credit. This agreement fixed the terms of the credit at a 30-year repayment period with no payment for the first eight years, an interest rate of 2%, and repayment to be made in Afghan goods. Following these developments, an umbrella agreement was signed between the two countries on March 1, 1956, covering specific projects to be financed from the $100 million credit. In addition, the Soviet Union, in 1958, advanced a loan of $10 million for petroleum exploration in the northern part of Afghanistan.

The Soviet aid has reportedly been poorly administered, and considerable disdain has been voiced in Afghanistan concerning the quality of the goods supplied. END

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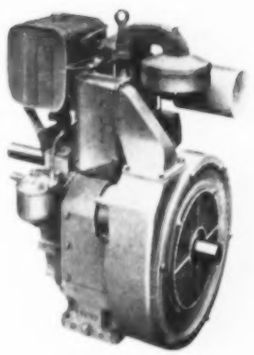

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BAHRAIN

PHYSICAL DEVELOPMENT

EXPLORATION: An exploratory discovery was made at Jebel Dukhan No. 1 on June 1, 1932. Since that time development has continued, but possibilities are limited. Bahrain Petroleum Co. (BAPCO), owned by Caltex (which is owned 50% by Standard of California and 50% by The Texas Co.) is the operating and concessionary company.

Bahrain Petroleum Co. during 1958 studied seismic data obtained from a land survey done in early 1957 which was followed by a marine seismic survey of parts of the Bahrain offshore area. On the basis of these data, the company spudded a wildcat, located on the Buri structure, northwest of the producing field. The well was spudded in September, and was at 4,800 ft and still drilling as this report went to press.

PRODUCTION: Production during 1958 was 40,748 b/d, up about 30% over 1957 levels. The increase in daily production in 1957 and 1958 was due to a re-arrangement of the producing pattern and facilities, and by the discovery of small additional reserves on the flanks of the main Bahrain field.

BAHRAIN—Crude-Oil Production, 1958
(Barrels Per Day)

January	34,580	July	40,654
February	35,626	August	40,483
March	37,522	September	43,287
April	40,000	October	45,287
May	40,238	November	45,349
June	40,377	December	45,183*

1958 (year) 40,748 b/d

BAHRAIN—Well Status, Year End 1957

Drilled and completed	184
Producing oil	143
Producing gas	4
Injection wells	3
Observation wells	3
Abandoned wells	21
Repairing and standing	10
Drilling and completing	1

BAHRAIN DRILLING

YEAR OF COMPLETION	NUMBER OF WELLS DRILLED: Oil Wells	Gas Wells	Dry Holes	Total For Year
1932	1			1
1933	2			2
1934	11			11
1935	6		1	7
1936	20			20
1939	10			10
1937	8			8
1938	10			10
1940	3		1	4
1941				0
1942				0
1943				0
1944				0
1945				0
1946	4	1*		5
1947	6			6
1948	1			1
1949	1	1*		2
1950	5			5
1951	5	1	3	9
1952	7			7
1953	8			8
1954	14	1		15
1955	15		1	16
1956	19			19
1957	16		1	17
1958 (to October)	1		3	4
Total	175	4	10	187

*Completed as gas-injection wells.

REFINING: There is only one refinery in Bahrain, a large plant at Sitka, which has a 186,500 b/d crude throughput capacity. Facilities are as follows: 19,950 b/d thermal reforming, 16,020 b/d thermal cracking, and 27,300 b/d catalytic cracking; 10,450 b/d Platformer; 2,050 b/d cat. polymerization. A b/d Unifiner and Platformer was completed during 1957.

TRANSPORTATION: There are two 12-in. pipelines from the Dammam oil field to Saudi Arabia. They are 34 miles long, of which about 14 miles is under water.

MARKETING: Consumption within Bahrain, estimated at 27,900 b/d (crude-equivalent basis) in 1958, was 12.8% over 1957

OIL LAWS

No information is available on the terms of the concession held over the entire country by BAPCO.

On February 22, 1958, an agreement was made between Saudi Arabia and Bahrain for the definition of their respective oil rights in the offshore area lying between their territories. Space reasons do not permit its reproduction in full here, but copies are on file with *World Petroleum Report's* New York offices. Heart of the agreement is the article which states:

"This area cited and defined above shall be in the part falling to the Kingdom of Saudi Arabia in accordance with the wish of H.H. the Ruler of Bahrain and the agreement of H.M. the King of Saudi Arabia. The exploitation of the oil resources in this area will be carried out in the way chosen by His Majesty on the condition that he grants to the Government of Bahrain one-half of the net revenue accruing to the Government of Saudi Arabia and arising from this exploitation, and on the understanding that this does not infringe the right of sovereignty of the Government of Saudi Arabia nor the right of administration over this above-mentioned area." END

IRAN

PHYSICAL DEVELOPMENT

EXPLORATION: The impact of new concessions granted in 1957 and 1958 has not as yet been fully felt, but it soon will be. On its exploratory area, IPAC (joint structure for Pan American and the government's NIOC; see Oil Laws section of this report) will spud its first offshore wildcat by July 1, 1959. This development will be most significant, and likelihood of really major production finds are excellent. Exploratory crews are already at work in the area.

During 1958, the joint Italian-Iranian firm SIRIP had field parties conducting geological reconnaissance as well as detailed surveys in the Zegros region and coastal Makran. A marine seismic crew completed a survey of all offshore areas in the Persian Gulf and the Sea of Oman. Location for the first offshore well during the first quarter of 1959 was decided. A USA Le-Tourneau barge will be used.

Government Operations: NIOC itself pushed along exploratory efforts through its wholly owned subsidiary, Iran Oil Co. Two seismic crews have been in operation continuously. One has been doing reflection surveys in the alluvial plain bordering the Caspian Sea and in Semnan. The other has been carrying out detail work on structures in Qum.

Iran Oil Co. had six rigs in operation. Four heavy rigs are drilling continuously in the Qum region—three of these on the Alborz anticline, viz., Alborz 5-A, 6, and 7; and one on the Saradjeh structure some 30 miles southeast of Alborz. Sarajeh No. 1 hit high-pressure gas between 7,600 ft and 8,000 ft on August 4, 1958.

Another rig has been drilling in the Mazanderan plain south of the Caspian Sea, where two stratigraphic holes have been completed. For extending the Naft-i-Shah field in northwestern Iran, another rig went into operation, and one production well has been completed so far. The rig is currently drilling a second production well in this field.

During April, a new well was spudded in central Iran to prove the oil potential in the Qum area, where three years earlier the No. 5 Alborz had blown out at a rate estimated between 80,000 b/d and 100,000 b/d. Drilling results on the Alborz structure so far have not confirmed the high promise of the No. 5 well. Meanwhile, drilling operations are being extended elsewhere: for example, the Saradjeh structure mentioned earlier.

Consortium Exploration: A total of nine rigs was operating for the consortium in 1958, including two on exploratory wells at Ahwaz and Kuh-i-Binak. Ahwaz No. 6 was at 9,798 ft on November 28 and below the Asmari limestone. Plans were to start drilling in the fall in the Bandar Abbas area on the Persian Gulf, following seismological surveys by Geophysical Services Inc., of Dallas, Texas.

The spectacular 46-day fire at Ahwaz No. 6 was the signal of the first oil found in this area of southwestern Iran, some 35 miles southwest of the Haft Kel field. The well had caught fire after a blowout of dry gas at 8,093 ft, with an estimated flow of 100 million cubic feet per day.

During 1958, twelve new wells were drilled, of which nine were successfully completed as producers, six at Agha Jari—two at Gach Saran, and one at Naft Safid. Three others were abandoned or suspended. In addition, 18 workover operations were completed—15 as producers, and three as observation wells. At the end of September 1958, drilling operations were in progress on six exploitation wells and two exploration wells.

Geological, geophysical, and topographical survey parties were employed throughout the year on stratigraphic studies, seismic and gravity surveys, and surface mapping over a wide area in South Iran. This is a continuation of the program to define the entire agreement area.

At Binak No. 1 well, where drilling began in March 1958, a depth of 5,827 ft had been reached by November 28, including running and cementing two strings of casing.

Nonassigned zones of Petroleum Districts I, III, and IV in Iran remain open. District I includes the continental shelf of the Persian Gulf. Districts III and IV are in the south of Baluchistan, from the Straits of Hormoz to the Pakistan border. The districts were opened to public bidding in February and March of 1958. The areas remain open until NIOC publicly announces they are closed, and gives three months' notice.

In response to NIOC's call for bids during November 1957, a total of 57 companies ex-

(Continued)

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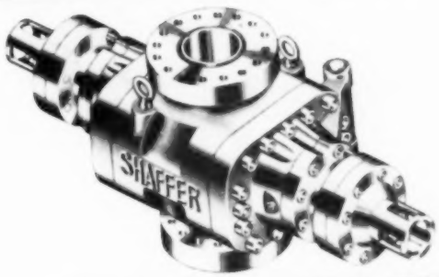

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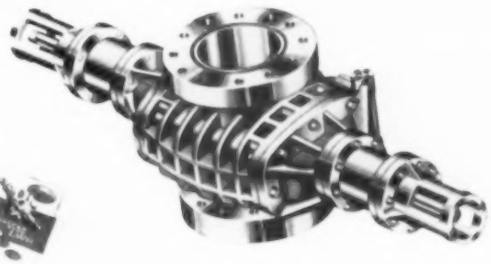

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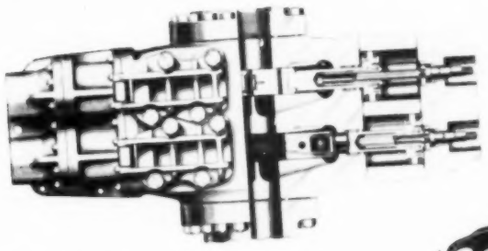

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IRAN *(continued)*

pressed interest—of which 11 were declared 100% competent and 10 partly so (one was rejected). Following the February 1, 1958, announcement, 17 out of 21 companies whose competence had been established obtained specimen agreement forms, and on March 31, 1958, six proposals were received for District I, of which Pan American was the winner. Other offers were considered "below standard." Districts III and IV were opened, March 1, 1958. Nine companies were interested; two proposals were received, and Sapphire Petroleums Ltd. was the successful bidder.

No further agreements had been made by Iran, as of January 1, 1958, with foreign oil companies—although NIOC has called for new bids on all areas in its Districts I, III, and IV on which oil rights had not yet been granted. In October, when NIOC turned down a joint bid from Royal Dutch-Shell and Jersey Standard, these companies decided not to submit any new proposals.

All the area south of Pan American's concession is still open; but it is much less favorable geologically, and the bottom drops to 180 ft to 240 ft—too deep for present techniques. Because of this, and because the government is holding out for a bid similar to the Pan American arrangement, the companies generally do not think the area worth it. In addition to the greater depths in the offshore area, the onshore coastal part is geologically similar to the Makran coast of Pakistan. During 1958, Hunt Oil Co. drilled two very expensive deep tests in this part of Pakistan, and both were dry. This makes Iran's onshore coastal area considerably less interesting than formerly had been believed.

The logical bidder for offshore concessions is, of course, the consortium, which is potentially the world's most powerful oil marketing group with practically unlimited resources and representing every major oil company in the world. The consortium, however, is handicapped by its existing oil rights which prevent it from offering terms similar to those given by Pan American which the government considers suitable.

After final allocation of areas now declared open, the government is expected to close up new grants for a few years, since it has more than enough commitments to meet under present concession obligations if production is found, since NOIC must contribute half of expenses when commercial oil is found.

IRAN—Oil Fields

Name of Field	Year Oil Discovered	Limestone Depth (Feet) Min.	Limestone Depth (Feet) Max.	API Gravity	Production (Barrels Per Day) 1st 9 Months 1958	Production (Barrels Per Day) Year 1957
Agha Jari	1938	4,900	10,100	34.2	500,000	453,000
Naft Kel	1927	1,900	4,900	38.0	146,000	120,000
Naft Safid	1936	3,000	7,050	35.2	61,000	43,000
Gach Saran	1926	2,750	10,550	32.3	60,000	48,000
Masjid-i Sulaiman	1908	700	5,300	37.4	38,000	41,000
Lali	1938	3,950	9,000	37.0	18,000	11,000
				Total	823,000	716,000

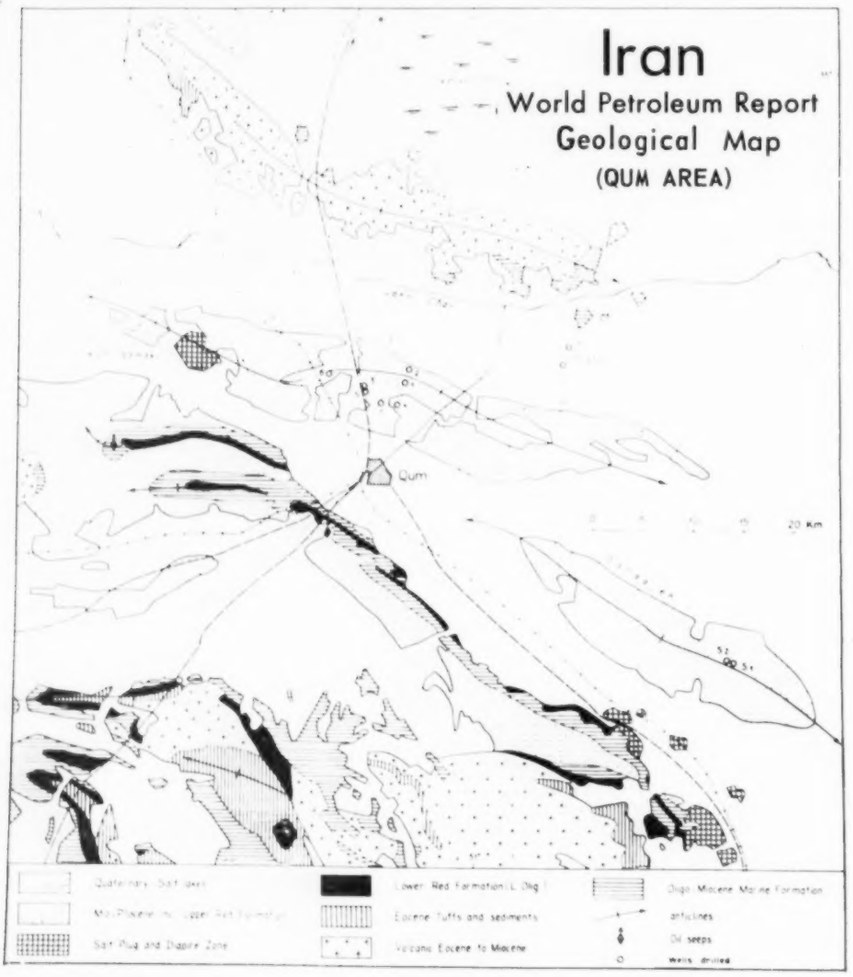
Source: Consortium

PRODUCTION: Total production in Iran rose to 822,000 b/d during 1958 (these figures are official and include the entire year). Agha Jari field is the mainstay of Iran's production. It averaged 450,000 b/d in 1957, with 22 of the 36 wells on production at year-end. With completion in July 1958 of a new 150,000 b/d separation plant and a new 16-in. to 20-in. pipeline to Bandar Mashur, the field capacity increased to 600,000 b/d. Production from the other major field, Gach Saran, is planned to go to 450,000 b/d under a long-range development program. Held back to 60,000 b/d now, it will soon be served by a large pipeline to a huge new loading terminal on Kharg Island in the Persian Gulf.

IRAN—Crude-Oil Production, 1958
(Barrels Per Day)

January	842,000	July	793,000
February	763,000	August	879,000
March	846,000	September	904,000
April	843,000	October	811,000
May	744,000	November	806,000
June	709,000	December	822,000

Year (1958): 822,000 b/d



TRANSPORTATION: After a study of several site possibilities for the terminal of a 26-in., 28-in., and 30-in. pipeline from Gach Saran, the decision favored Kharg Island. This 100-mile line will include a 25-mile section under the sea. Kharg Island provides shelter from rugged northwest storms in the Persian Gulf. Deep water lies close to its southeastern shore, where the terminal is to be located. There is space for an air strip and a tank farm at an elevation to permit gravity loading of tankers. The pipeline will have an initial capacity of 330,000 b/d, and Gach Saran is 2,250 ft above Kharg Island in elevation, which will permit gravity flow to the terminal. With this volume of throughput, the terminal will be able to load tankers of over 100,000 tons in 1960. At Bandar Mashur (crude-oil loading port), No. 5 jetty was completed and in operation at year-end 1957. Jetty No. 6 was in operation before year-end 1958. New tanks completed and under construction give Bandar Mashur 1,700,000 bbl of added storage capacity compared with the position at year-end 1957.

NIOC will invite bids for a new loading terminal for products of the Abadan refinery—including a 25-mile pipeline from Abadan to Khor Mussa, six miles west of the port of Shapur. About 320,000 b/d of products will be loaded in the new terminal, with construction to start in 1959. The port will only be able to handle up to 40,000-ton tankers; 100 storage tanks with capacity of six million tons of refined products will be built. This would make an important link in Iran's economy—one free of foreign control, since the Iraqi government exercises navigation rights over the Shatt el Arab River, which tankers traverse now, and collects about $20 million yearly from the Iranian government for transit fees.

Construction has begun by NIOC on a new

IRAN—Summary of Oil Statistics, 1958

	1st 9 months 1958	Year 1957
Crude-oil production	821,000 b/d	716,000
Abadan refinery throughput	317,000	314,000
Crude-oil exports	486,000	389,000
Products to NIOC	50,000	39,000

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ITALY: NYMCO, S.p.A. 9, Lungotevere A. da Brescia, Rome
JAPAN: Maruwa Bussan KK, No. 3, 2 Chome, Kyobashi, Chuo-Ku, Tokyo
KUWAIT: F. N. Dahdah, Box 1713, Al Kuwait
MEXICO: R. E. Power, Sierra de Mijes, No. 125, Mexico, D.F.
NETHERLANDS: F. E. C. Jenkins, Hoefbladlaan 134, The Hague
PERU: International Gas Lift Company, Apartado 71, Talara
TRINIDAD: Neal and Massy, Ltd., Port of Spain, P.O. Box 544, San Fernando

products pipeline. It is a 200-mile 6-in. and 8-in. extension of the Trans-Iranian products line from Teheran north to Resht on the Caspian. The line will extend all the way (800 miles) from Abadan refinery, on the Persian Gulf, to the Caspian Sea, completely spanning Iran.

During 1958, Abdullah Entezam, NIOC president, stated a pipeline from the Qum field to Turkey was being discussed—adding that this would be the first not to pass through the Arab States. An intercountry agreement has been signed for the line.

For a review of consortium pipeline systems, see *World Petroleum Report—1957*.

REFINING AND MARKETING: There are only two refineries, a 3,000 b/d plant owned by NIOC at Kermanshah, and the huge 460,000 b/d plant owned by the consortium at Abadan; for facilities, see *WPR-1958*. The possibility of a refinery at Teheran is being discussed by NIOC.

CONSUMPTION: Island consumption of major petroleum products totaled 17,555,000 bbl in 1957, including (in thousands of barrels): 3,290 gasoline, 4,480 kerosine, 2,585 gas oil, and 7,200 fuel oil. It was expected to increase by 14% in 1958.

Total oil exports in 1958 by the consortium are estimated at 36 million tons.

With the expected increase rate of 15% yearly, consumption should reach 400,000 b/d by 1975. The burden of supplying this falls on NIOC, and that company is extremely anxious to increase internal pipeline facilities to handle it. Conceivably, the entire Qum area production would be needed to supply consumption, presuming Qum proves capable of sustained major production.

OIL PAYMENTS: During 1957, payments by the consortium totaled $216.7 million, an increase of 42% over 1956. Payments by the consortium during 1958 were $248,160,000 (88 million pounds)—including payments in respect of the income tax and stated payment (including oil received in kind). To both these figures could be added the company expenditures in Iran. During 1957, these amounted to $42.8 million. To the 1958 figure should be added $25 million paid by Pan American as a bonus for its new concession.

OIL LAWS*

There are four major concession contracts of interest in the country, and one major oil law. The oil law is covered in *WPR-1958*, p. 156. The consortium agreement of 1954 is summarized in *WPR-1957*, p. 114. There remain the Pan American, Sapphire, and AGIP agreements, the first two of which are summarized below. These laws and concession contracts are kept, in French, Persian, and English, on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

AGIP-MINERARIA. NIOC-AGIP concessionaire. [(Ste. Irano-Italiénne des Pétroles (SIRIP), operator)]—**Date of Agreement:** 7-31-57. **Area:** (1) Offshore, approx. 5,600 sq km; (2) east of Zagros, approx. 11,300 sq km; (3) coast of Oman Sea, approx. 6,000 sq km. **Relinquishment:** 25% end of 1st 5 yrs. plus 25% within next 4-yr. period. **Term:** Exploration 12 yrs; exploitation 25 yrs. from commercial production. **Renewal:** Three 5-yr. renewals—the last two on the then current conditions. **Government Ownership:** 50% by NIOC. **Rental:** None. **Bonus:** None. **Local Tax:** 50%. **Royalty:** None. **Minimum Work Expenditure:** $22 million within 12 yrs. AGIP bears entire cost unsuccessful exploration; NIOC shares 50% if successful. **Ownership of Oil:** SIRIP at well head. **Marketing:** SIRIP markets at posted price or discounts agreed by AGIP and NIOC. **Tanker Obligation:** None. **Drilling Obligation:** Commence drilling within 4 yrs. **Refinery Obligation:** None. **Oil for Internal Consumption:** None. **Oil in Kind:** NIOC may purchase its 50% share of oil from SIRIP. **Local Participation in Management:** Half of directors to be appointed by NIOC. **Gas-Utilization Facilities:** None.

PAN AMERICAN PETROLEUM CORP., NIOC-Indiana concessionaire [(Iran Pan American Oil Co. (IPAC) operator)]—**Date of Agreement:** 4-24-58. **Area:** Offshore, 16,000 sq km: (1) 1,000 sq km north of SIRIP area; (2) 15,000 sq km south of SIRIP area. **Relinquishment:** 25% end of 1st 5-yrs. plus 25% within next 5-yr. period. **Term:** Exploration 12 yrs.; exploitation 25 yrs. from commercial production. **Renewal:** Same as AGIP-Mineraria (see above). **Government** production. **Local Tax:** 50%. **Special Tax Ownership:** 50% by NIOC. **Rental:** $400 per sq km 13th through 17th year; $480, 18th through 22nd; $600 per sq km of area retained 23rd yr. and each succeeding year. **Bonus:** $25 million initial; none after commercial **Provisions:** Tax calculated on 50% of production regardless of liftings. 10% of initial bonus is deductible annually for first 10 yrs. of commercial production. **Royalty:** None. **Minimum Work Expenditure:** $82 million within 12 yrs. PanAm bears entire cost of unsuccessful exploration; NIOC shares 50% if successful. **Ownership of Oil:** At well head; 50% PanAm, 50% NIOC. **Marketing:** PanAm or NIOC separately, or IPAC as agent. Monthly settlement between partners, with ½ excess value of partner lifting more paid to partner lifting lesser quantity. **Tanker Obligation:** Preferential consideration to Iranian-flag tankers. **Drilling Obligation:** Commence at least one well within 18 mos.; $350,000 penalty for each month of delay after 18. **Refinery Obligation:** None. **Oil for Internal Consumption:** Max. 10% of total production, at cost plus 14¢ per cubic meters. **Oil in Kind:** Either party has right to take its share of oil in kind. **Local Participation in Management:** Half of directors appointed by NIOC; 51% of top executives to be Iranian. **Gas-Utilization Facilities:** None.

SAPPHIRE PETROLEUMS LTD. CONCESSION

Terms of the Sapphire Petroleums concession are identical with those of the Pan American Petroleum Corp. agreement, with the following major exceptions: No cash bonus is payable (Art. 30 and 31 of IPAC agreement, therefore, not included). Minimum exploration expenditure is $18 million (IPAC minimum is $82 million) in 12 years, of which $8 million (IPAC's is $34 million) must be spent in first four years. Minimum for fifth and each succeeding year is $1.25 million (IPAC's is $6 million yearly). No provision is made for assigning agreement to any subsidiary company, as in Art. 36 of the IPAC agreement. Single penalty of $350,000 for failure to carry out drilling obligations is contained; this compares with $350,000 monthly penalty for IPAC. Areas granted to Sapphire are designated by an NIOC map. They cover about 386.1 square miles.

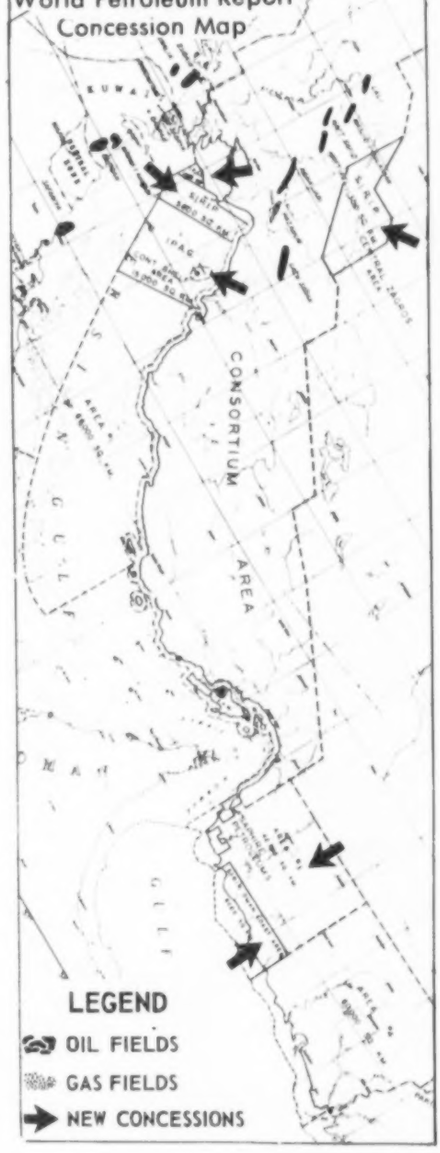
NEED OIL LAWS? CONCESSION TEXTS? All the World's oil laws and concessions are kept on file, *in English translation*, by us. See World Petroleum Legislation Report, page 22 this volume.

NATIONAL FACTORS

Although located in the Middle East, Iran is not an Arab country, and has little or no affinity for Arab nationalism. This is an extremely important fact from the standpoint of investment favorability since the recent rise of Nasserism throughout Arab countries. It increases stability to that extent. However, the political situation is extremely fluid, and reports from the country indicate a good deal of unrest. Part of this is due to machinations of the USSR, which has long considered contiguous Iran its natural invasion route to the Middle East—if it ever comes to that.

As previously reported in *World Petroleum Report—1958*, the Qum discovery helped to divert attention from the consortium following the nationalization and settlement of 1954. The nature of the consortium helps too; as an amalgam of nationalities, it is less a target than a company of single nationality. There are disadvantages, however; as a many-sided entity, it does not have the personality a single-nationality company would have, and the difference is noted among its Iranian employees. There were also extreme difficulties to overcome between owners as to differing theories of operation; for instance, British preoccupation with paternalism was not popular with American participants who believe in the high-wage low-obligation route. But it has worked satisfactorily, although it has had difficulties in integrating itself into the economic life of the

(Continued)



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for The Burma Oil Co. (1964) Ltd. Main Contractor: Foster Wheeler Ltd. (London)

CANADA *at Clarkson, Ontario*
for British American Oil Co. Ltd. Main Contractor: The Lummus Co.

COLOMBIA *at Cartagena*
for International Petroleum Co. Ltd. Main Contractor: Bechtel Corporation (Insulation Contractor: Harold Aber & Co.)

ECUADOR *at La Libertad*
for the Anglo-Ecuadorian Oil Co. Ltd. Main Contractor: Proctor (G. B.) Ltd.

ENGLAND *at Kent Oil Refinery*
for The British Petroleum Co. Ltd.

FRANCE *at Raffinerie de Normandie*
for Compagnie Francais de Raffinage. Main Contractors: Kellogg International Corporation and Foster Wheeler Ltd. (France). (Insulation Contractor: Soc. Technisol)

IRAQ *at Daura, near Baghdad*
for Iraq Government Oil Refinery Administration. Main Contractor: Foster Wheeler Ltd. (London)

ITALY *at Genoa*
for Raffineria Dottore E. Garrone. Main Contractor: C. T. I. P.

KUWAIT *at Akmadi*
for the Kuwait Oil Co. Ltd. Main Contractor: Bechtel-Wimpey and E. B. Badger & Sons Ltd.

THE NETHERLANDS *at Pernis*
for N. V. de Bataafsche Petroleum Maatschappij.

NETHERLANDS ANTILLES *at C.P.I.M. Refinery, Curacao*
for Royal Dutch-Shell Group.

SCOTLAND *at Grangemouth*
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consortium community in Iran.

Another problem of the consortium is overemployment. About 28,000 persons are employed at Abadan, and less than half this number would be sufficient in a modern refinery of comparable size elsewhere. It is obviously impossible to discharge large numbers of employees due to the political situation.

Oil Policy: A responsible official, Mr. F. Naficy, director of exploration and production for NIOC, has outlined Iran's oil policy as follows: "The Iranian petroleum legislation provides for any reputable operator, large or small, with (1) know-how, (2) money, and (3) willingness to take a calculated risk, to enter into an agreement with NIOC in order to explore and/or develop independently, or in partnership with NIOC, the petroleum resources of an area commensurate with its ability to spend, while enjoying (1) complete security from political, legislative, fiscal, or other changes in working conditions; (2) full freedom of action in its operations; and (3) assurance of a generous return on its investment, if successful."

OIL'S IMPORTANCE TO IRAN

The importance of oil is very large in the Iranian economy. According to the government, the percentage of energy supplied by petroleum ranges roughly from 90% to 95% of the total energy supply of Iran.

Of the total government revenues in the March 1958-March 1959 budget, some 30% is derived from oil operations. If expenditures under the Plan Organization and by NIOC are added, the share rises to roughly 50%. *(Source:* Letter from Iranian government dated November 20, 1958).

IRAQ

PHYSICAL DEVELOPMENT

EXPLORATION: An announcement in December 1958 stated BPC had given up all its offshore area. More news was made by the surrender of the Khanaquin concession.

Three major companies are operating in Iraq, viz., IPC, Basrah Petroleum Co. (BPC), and Mosul Petroleum Co. (MPC)—all of them under a common ownership. For a review of the history of Iraq's exploration and oil development, see *World Petroleum Report—1957.*

No major discoveries were made in 1958. Effort by IPC and its asociates has been very discouraging in recent years, but the company embarked on a long-term project in 1958 which calls for drilling 26 wells by 1960.

In the area held by Basrah Petroleum Co. Ltd., two wells were drilling in December 1958: Samawa 1, spudded August 31, was at 8,303 ft; and Rumaila 21 was at 54 ft. Nahr Umr 3, spudded during March, had reached a depth of 10,109 ft in November, when drilling was suspended. Suhain 1, spudded October 22, 1957, about 190 miles southeast of Baghdad near the Persian frontier, was abandoned at 8,505 ft in October 1958.

A fourth exploration well, Musaiyib 1, which had been spudded, December 3, 1957, 40 miles south of Baghdad, was abandoned at 12,087 ft in August 1958.

Two seismic parties and a geological party were operating in the BPC concession area during December. Earlier company reports indicated that, among the regions being studied, were the al-Ahwar region of southern Iraq and the al-Shamaijah Desert of western Iraq, 250 miles from Baghdad.

Mosul Petroleum Co. Ltd. had two wells drilling in December 1958. Anah 2, spudded May 20, about 20 miles west of Fallujah, had reached 10,421 ft; and Khleisia 1, spudded August 1958, about 100 miles west of Kirkuk near the Syrian border, was at a depth of 8,172 ft.

A third test, Fallujah 1, which was spudded during August 1957, 60 miles west of Baghdad, was abandoned at 9,592 ft in August 1958.

There were three seismic parties operating in MPC's concession area throughout September.

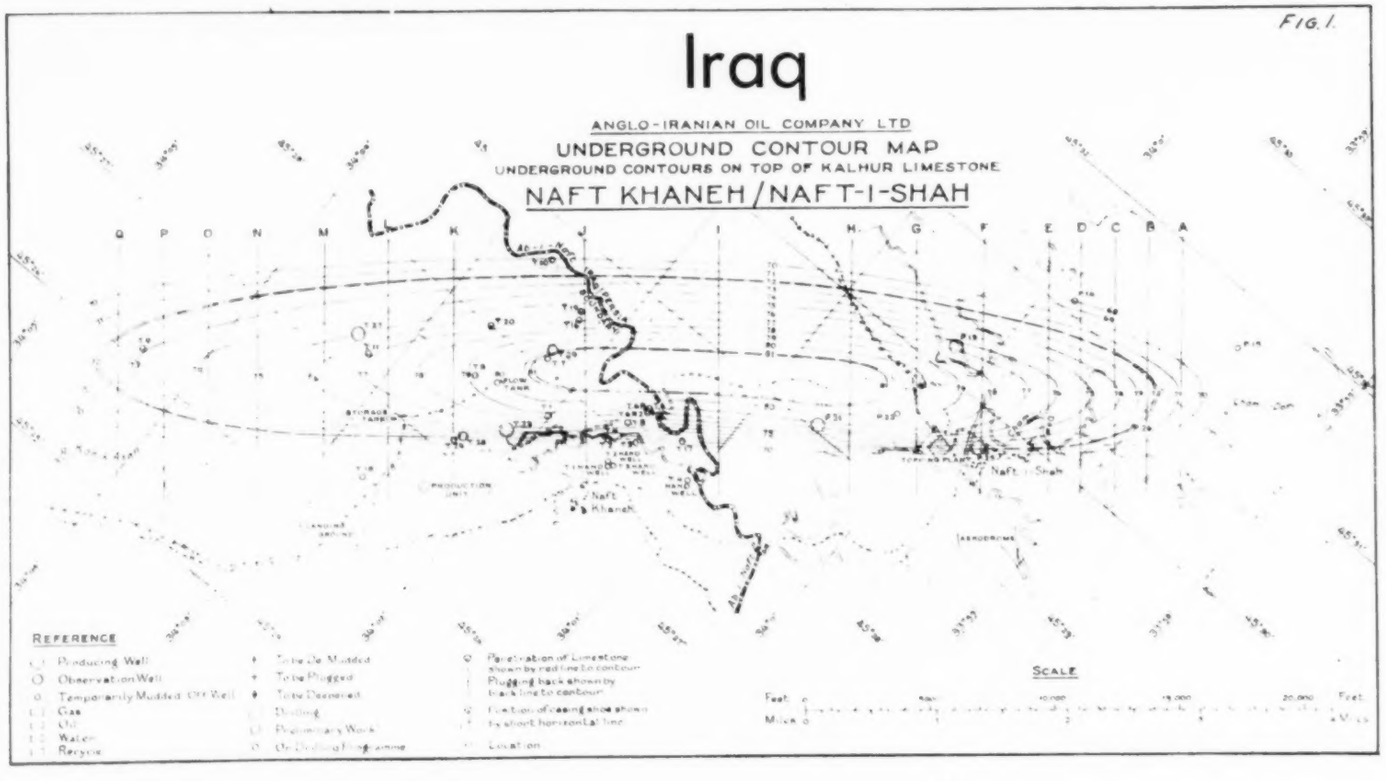
IPC had four wells drilling: Kirkuk 117 went below 7,500 ft, with no shows reported; Kirkuk 123 went to 4,500 ft, and was completed as an observation well; Pulkhana No. 5 was running casing at 5,400 ft as 1958 neared its close; and Gilibat was below 5,130 ft.

PRODUCTION: Crude-oil production in Iraq in 1958 hit a new high at average 724,526 b d. The output by IPC and its associated companies was 35 million long tons.

Kirkuk in northern Iraq, the country's main oil field, became in 1958 one of the four fields in the world to have produced over 200 million tons of crude oil. The other three are the East Texas, the Burgan field in Kuwait, and Vene-

(Continued)

FIG. 1.



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zuela's Lagunillas field. Iraq Petroleum decided to establish a water-injection program to maintain reservoir pressure in the Kirkuk field. Water is to be taken from the Zab River at Dibis and injected under pressure in pay horizons below the oil-water contact.

In addition to production by Iraq Petroleum and its associated companies, Khanaquin Oil Co. Ltd., a British Petroleum Co. subsidiary operating in the smallest Iraq concession (Naft Khaneh), continued to produce oil from a field which straddles the Iran frontier until November 1958, when it relinquished its concession. Khanaquin production in 1957 averaged 4,230 b/d, and three wells were producing oil at the end of that year. The concession was surrendered in 1958.

IRAQ — Crude-Oil Production
(Barrels Per Day)

January	615,743	July	753,771
February	603,410	August	788,398
March	650,835	September	798,581
April	634,445	October	815,467
May	705,574	November	779,856
June	753,332	December	795,972

Year (1958) 725,426

TRANSPORTATION: Iraq Petroleum Co.'s pipeline system from the Kirkuk fields to the Mediterranean Sea was restored to its capacity of 500,000 b/d in the summer of 1958, and it was scheduled for expansion to about 560,000 b/d by early 1959 by construction of 76 miles of 30-in. and 32-in. loops, and a 40-mile 24-in. loop all between T-2 pumping station and Banias in Syria.

Additional pumping capacity in three stations in Iraq and one in Syria helped to restore the capacity to the level prior to destruction of pumping stations during the Suez crisis. IPC pumps 350,000 b/d through the Kirkuk-Banias system, and 150,000 b/d through the Kirkuk-Tripoli system. Flow through this latter system was reduced for a short period in 1958 due to sabotage during political unrest in Lebanon.

Construction is soon to start of Basrah Petroleum's new deep-water (offshore) terminal at the head of the Persian Gulf at a cost of £25 million. The new port, to be completed by early 1961, will be able to load two out-size tankers (65,000 tons) simultaneously, and effectively boost the company's export capacity from southern Iraq fields by about 75%.

The new terminal, which will be about 25 miles south of Fao, the present port on the Shatt-al-Arab River, will overcome problems posed by that port. Even after extensive dredging, Fao can only handle tankers of up to 26,000 tons. However, the new port is expected to pose some international maritime problems.

The terminal will be built on steel piles, with a central platform 400 ft long by 242 ft wide. One tanker will be able to berth along each side. Loading capacity is expected to be at rates up to 28,000 bbl per hour for each ship. The terminal is to be connected to Fao by two 32-in. under-water pipelines.

During 1958, some discussions took place on a tanker fleet. It was reported in May that the Iraqi Maritime Transportation Co. was considering the possibility of negotiations with the oil companies in Iraq to transport part of their production in tankers which it would purchase. In August, the Iraqi press reported the government of Iraq had proposed that the Arab oil-producing States operate their own fleet of tankers and had passed this suggestion on to United Arab Republic President Nasser.

REFINING: The expansion of the Daura (Baghdad) refinery to 48,000 b/d from its present 24,000 b/d is still under way, with completion slated for July 1959. The other processing plant of the Government Oil Refineries Administration, the 1,200 b/d asphalt plant at al-Quayyarah, is to be converted into a conventional refinery of about 8,000 b/d capacity, at an estimated cost of $8.5 million.

In May 1958, the Iraqi government began a study of plans for building a new refinery near Basrah with a capacity of 125,000 b/d, presumably to use southern crude, consisting of the 12.5% share in kind of total production to which Iraq is entitled under the 1952 agreement. No further information on the Basrah refinery project has been reported. However, in October 1958, the Iraq Development Board announced plans to use natural gas from Rumaila field for a power plant and fertilizer factory in Basrah, a program which presumably would require a 30-mile gas pipeline.

In the north, a contract was signed with Ralph M. Parsons Co., in June 1958, for a 300-ton-per-day sulfur plant at Kirkuk, at a cost of almost $20 million. To operate on natural gas from the Kirkuk field, the plant will also produce 300,000 Imperial gallons per day of propane, butane, and gasoline. Its sweet natural-gas output of 50 million cubic feet per day is to be piped to Baghdad for both industrial and residential uses. Completion of the sulfur-recovery unit is anticipated by July 1960.

MARKETING: Total exports for 1958 were 33.2 million tons (660,000 b/d average). The expansion projects for pipelines and terminals indicate that Iraq's plans to boost exports will continue. These facilities will raise capacity to 1.2 approximately million barrels per day by about 1961.

OIL LAWS*

There is no general oil law in Iraq. The country is covered by four concessions, and a summary appeared in *World Petroleum Report —1958*, p. 160. The originals of all concessions in Iraq and their subsequent amendments are kept on file at the New York offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y.

In August 1958, the government passed Law No. 4, amending Law No. 9 of 1952 for the Administration of the Government Oil Refineries. The revised law has changed the setup and the functions of the board of directors. Under the original law, decisions of the board were sent to the Minister of Economics for his information, whereas the revised provision gives the right to the minister to demand the reconsideration of any decision which he may deem prejudicial to the interest of the public. The new arrangement enables the Council of Ministers to have the final word on any difference arising between the minister and the board.

In September 1958, Iraq banned the release of information on refinery production, on the grounds of national security. Current regulations require all requests for information to be made to the Foreign Office in writing. The Ministry of Economics has issued an order forbidding release of any information from that ministry without prior approval.

By September, however, the new Iraqi government had reaffirmed its intention to honor existing international agreements with the oil companies. Assurances were given to Iraq Petroleum Co. to that effect. However, the government told IPC that it reserved the right to invoke the terms of the Iraqi letter of September 1951 which stated that, in the event of a neighboring country receiving a higher average revenue per ton of oil exported than was currently being received by Iraq, the government would claim a similar amount. IPC, on the other hand, had agreed to increase crude-oil production and to give up some of its acreage to let other oil companies in.

A decree published November 18 extended Iraq's territorial waters to 12 miles. A government declaration said that, where waters of neighboring countries were affected, Iraq would be prepared to solve any problems arising in accordance with international law or by mutual agreement. If the decision is internationally accepted, work could begin on the construction of a new deep-water oil terminal south of Fao. An Iranian Foreign Ministry spokesman said, November 20, that Iran would take "most severe action" if Iraq's decision to extend its territorial waters interfered with Iranian shipping and oil exploration in the Persan Gulf.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

IRAQ—Oil Payments to Iraqi Government
(Millions of Pounds Sterling)

1956	80
1957	48.2
1956	69.1
1955	73.8
1954	68.5

NATIONAL FACTORS

Just exactly how far exports and oil revenues will go is related to the shifting character of the Iraq political situation since the overthrow of the old regime in July 1958.

OIL'S IMPORTANCE TO IRAQ

Total oil revenue to the Iraqi government reached a new high in 1958. As shown in the table, the 1958 figure was approximately 80 million pounds (about $222.4 million). The sharp rise over the year previous was due, in part at least, to the fact that the pipelines were operating at full capacity by the end of the year. END

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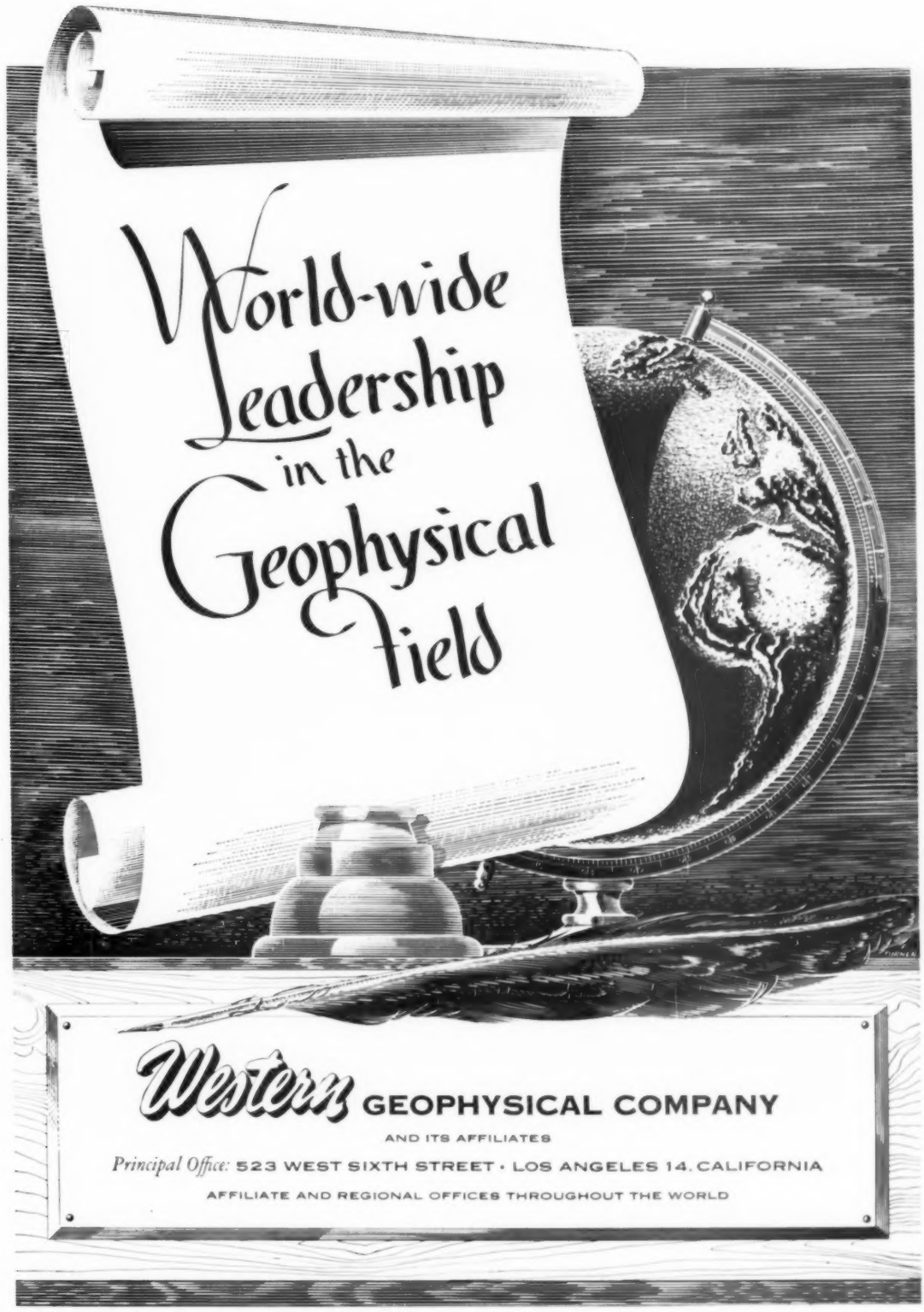
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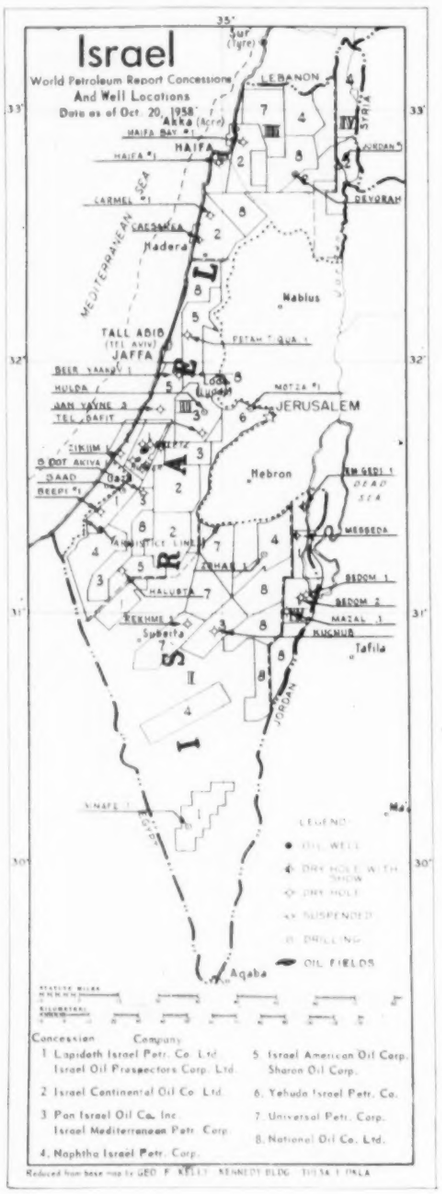
ISRAEL

PHYSICAL DEVELOPMENT

EXPLORATION: After five years of oil exploration (1952-58), Israel has a production of about 1,500 b/d, about 5% of her needs. During the period, more than 35 deep wildcat wells have been drilled, of which two found oil, viz., Heletz No. 1 and Brur No. 2. Since the Heletz No. 1 discovery (September 1955), 27 wells have been drilled in the field: 23 in Heletz and four in Brur. At the beginning of 1958, some 20 wells were on production; three were awaiting completion; and four were dry.

The first wildcat located on the basis of deep reflection seismic work, projected for 8,000 ft, was spudded in the Hulda area by Pan Israel Oil Co. and Israel-Mediterranean Petroleum Inc. (both of the William F. Buckley group) during August 1958. The test was abandoned dry at 7,400 ft. For a review of exploration since its inception, see *World Petroleum Report—1957*.



Through 1957, about $18 million, plus considerable expenditure in Israeli pounds, was invested in oil exploration. Further testing is suggested by the government in Jurassic levels of the Heletz, the graben of the Dead Sea area, the Negev, and the coastal plain.

The government is setting up a national oil exploration company as a result of the slowdown in exploration by private companies. Under a recently announced cabinet decision, the public will be invited to subscribe to stock in the new company in the amount of 11.2 million pounds.

PRODUCTION: During 1958, production averaged 2,700 b d, considerably more than hoped for in 1957 when the government estimated about 2,000 b/d would be produced in 1958. Some of the wells at Heletz, particularly the west flank wells and/or those on pump, had begun to produce too much salt water to allow the oil to be acceptable at the pipeline. Mazada, the company exploiting the field, said it was hoped to hold production of the field steady at 2,200 b d. This would cover about 8% of Israel's oil needs.

TRANSPORTATION: Considerable pipeline construction has been accomplished, as shown in maps contained in *World Petroleum Report—1958*. During 1958, a pipeline system linking Israel's port of Eilath, on the Gulf of Aqaba, with the Haifa refinery was opened by a final 90-mile 16-in. section from Ashdod Yam to Haifa; capacity, 100,000 b d. At Ashdod, 20 miles south of Tel Aviv, it is linked to Beersheba and thence to Eilath with only an 8-in. 24,000 b d line. Israel has been seeking $25 million in Paris to replace this 8-in. Eilath-Beersheba section by a 16-in. 90,000 b d line so as to permit the Haifa refinery to operate full-capacity.

Israel has renewed her offer to lay a $60 million 190-mile 32-in. 500,000 b d pipeline across the Negev desert. USA backing is sought. Actual completion is doubtful.

A 6-in. line, Israel's first products pipeline, from the Haifa refinery to Tel Aviv went into operation in 1958 with 11,400 b/d capacity.

REFINING: There is only one refinery in Israel, the 86,000 b d Haifa plant. During 1958, Royal Dutch-Shell and BP sold this jointly owned refinery to "interests associated with the Paz Oil." Book value of the controlling company's assets, Consolidated Refineries, is some £2,500,000. Paz Oil points to Iwol Investments, of which Isaac Wolfson is chairman. In the spring of 1958, Iwol Investments purchased Paz from Shell and BP; Paz is responsible for marketing about half the petroleum products sold in Israel.

OIL LAWS*

Controlling Statutes.* Israel Petroleum Law 5712-1952; Regulations for the Implementation of the Petroleum Law, 5712-1953, January 28, 1953; Petroleum Amendment (Law) 1957; Income Tax Ordinance 1947—Regulations concerning Deductions from Income of Holders of Petroleum Interests; Law No. 4 of August 2, 1958, amending Law No. 9 of 1952.

No changes have occurred in the basic oil regulation of Israel. For a summary of same, see *World Petroleum Report—1957* and *1958*.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

The basic factors affecting investment **favorability** are outlined in *World Petroleum Report—1957*, p. 125. Briefly they include (1) a favorable oil law; (2) tax and exchange benefits; (3) depletion allowance in the income tax; (4) duty-free equipment imports.

ISRAEL—Test Drillings
(As of August 1958)

No.	Well	Company	Total depth (Meters)	Bottomed in	Date Completed
1	MAZAL 1	Lapidot	597	L. Cretaceous	15-7-54
2	BEERI 1	Lapidot	3,646	Jurassic	4-2-55
3	MASSADA 1	Lapidot	1,711	Jurassic	8-9-55
4	CARMEL 1	Is-Con	2,865	Jurassic	23-2-55
5	TEL SAFIT 1	Pan Israel	2,563	Jurassic	17-3-55
6	REKHME 1	Is-Amer.	2,766	Triassic	14-4-55
7	PETAH TIQVA 1	Is-Amer.	2,553	Jurassic	16-8-55
8	KURNUB 1	Pan Israel	2,744	Triassic	9-2-56
9	HELETZ 1	Lapidot	1,515	L. Cretaceous	24-11-55
10	HAIFA BAY 1	Is-Con.	2,258	Jurassic	11-10-55
11	KING DAVID 1	Is-Con.	2,235	Jurassic	12-2-56
12	HALUTSA 1	Is-Amer.	1,662	Jurassic	5-3-56
13	HAIFA 1	Pan Israel	2,805.5	Jurassic	5-10-56
14	NEGBA 1	Lapidot	1,916	L. Cretaceous	17-5-56
15	S'DOT AKIV 1	Pan Israel	2,448	Jurassic	21-8-56
16	CAESAREA 1	Is-Con.	2,587	Jurassic	18-9-56
17	GAN YAVNE 3	Is-Amer.	2,645	Jurassic	7-9-56
18	BEER YAAQOV 1	Is-Amer.	2,450	Jurassic	18-9-56
19	TELAMIN 1	Is-Amer. Naphtha	1,893	L. Cretaceous	6-11-56
20	HAR SEDOM 1	Lapidot	2,715.5	?	24-9-57
21	REVAHA 1	Pan Israel-Naphtha	2,478	Jurassic	13-5-57
22	JORDAN 1	Is-Con.	1,382	L. Cretaceous	7-7-57
23	EIN GEDI 2	Is-Amer. Naphtha	2,571	L. Cretaceous	9-7-57
24	SINAF 1	Lapidot	1,613.0	Paleozoic	8-2-58
25	HELETZ 22	Lapidot	2,968.6	Jurassic	13-10-57
26	ZIKIM	Naphtha	2,563	Cenomanian	20-6-56
27	MOTZA 1	Yehuda	1,403.8	Jurassic	28-10-57
28	NEGBA 2	Lapidot	1,624.9	L. Cretaceous	13-6-57
29	SDOM 2	Lapidot	1,744.7	?	29-9-57
30	ZOHAR 1	Naphtha	1,999.5	Triassic	
31	DEVORAH 1	Is-Con.	1,094	Jurassic	30-1-58
32	SAAD 1	Lapidot			
33	HULDA 1	Pan Israel			

JORDAN

PHYSICAL DEVELOPMENT

EXPLORATION: The first, and so far the only, exploratory drilling in Jordan is being done by Phillips Petroleum. It is continuing work begun by Pauley Petroleum, which now holds 9.6% of the concession.

Phillips' concession covers approximately 7,743,000 acres. Surface geological studies and seismograph work have been completed on a portion of the concession; two wildcat wells have been drilled and abandoned; and a third well is now being drilled. The first well, located 35 miles E-SE of the capital city of Amman, the No. 1 Safra, was abandoned with no shows in Pre-Cambrian basement at a total depth of 8,482 ft. A second wildcat, located 15 miles north of Jerusalem, the Ramallah No. 1, was abandoned on June 14, 1958, at a total depth of 10,339 ft without reaching the basement. A second test will be drilled on this structure. The third well, Halhul No. 1, 20 miles south of Jerusalem, was spudded, June 29, 1958. It was plugged and abandoned at 6,010 ft, and the rig moved to Suweileh No. 1, 10 miles northwest of Amman. All three wells were on different structures.

Phillips is committed to drill two more wildcats in addition to the current third test on the concession. It may then pull out from its agreement with Pauley if it chooses. However, Pauley has stated he will continue exploration if Phillips pulls out.

Two other concessions, each covering one-third of the country, are known to exist. One-third of the country was granted to the Jorge Zimiri company (see *WPR—1958*). Indications are that this concession may have lapsed, although it was reportedly farmed out to Jackson Oil Co. A translation of this concession, and a translation of that held by Pauley, are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y.

An Italian businessman, Nino Cagnasca, has been granted the oil concession covering the last one-third of Jordan. His rights cover roughly what remains after Zimiri's company selects its acreage outside the Pauley-Phillips concession. Cagnasca runs a chemical plant called Salbar, near Milan, and is prospecting for oil in Italy, according to press reports.

PRODUCTION AND REFINING: There is no domestic production of crude oil. Neither are there any refineries—although the government has been considering construction of one for many years, and an agreement to build a refinery was signed by SNAM Progretti (Soc. Nazionale Metanodotti) with Jordan's government during late 1958. The refinery, which will cost US $9,855,000, will have 7,000 b/d capacity, and is due for completion in two years. Situated near Zerka, 15 miles north of Amman, it will receive crude from the Trans-Arabian pipeline. SNAM, a subsidiary of ENI, the Italian government's company, is to be paid in installments over a five-year period, with 5% interest payable on balance after refinery completion. A government spokesman said $11.2 million in stock had been subscribed, of which the government holds $700,000. Reportedly, an agreement has been reached with Tapline, the owner of the line from Saudi Arabia to the Mediterranean, to draw crude via a 50-km (30-mile) 8-in. spur pipeline from Tapline to the refinery. Cost of the line was estimated by the government at $1.1 million.

Tapline's crude-commitment agreements of 1952 with Jordan, Syria, and Lebanon give all three countries the right to purchase—under specified conditions—up to 200,000 tons per year (about 4,000 b d) of crude from Tapline.

The refinery will relieve Jordan of the threats of a stoppage in the transport of fuel oil from Lebanon through Syria, and of costly transport by truck from the port of Aqaba.

MARKETING: Jordan's oil supply had its ups and downs during 1958. Early in the year, a decree was issued which was a prelude to nationalization of oil marketing. It would force import and distribution of petroleum products in Jordan through a special government agency.

When the Iraqi revolution occurred, the supply from Iraq stopped abruptly. The United Arab Republic also cut off passage by air over Syria, and Jordan was hard hit by an oil shortage, since her consumption is increasing at an annual rate of about 15% and was 2,762 b/d in 1957. An emergency oil lift was begun by air and sea by the US government, and it ended successfully during December 1958 with the unloading at the port of Aqaba of 18,000 tons of various oil products. In all, 14,000 metric tons of gasoline, 21,000 tons of kerosine, 25,000 tons of diesel oil, 1,000 tons of fuel oil, and 250 tons of aviation gasoline, as well as lubricants, had been delivered to Jordan since July. The operation cost the US government nearly $4 million out of $5 million it had promised to Jordan in petroleum aid. The remaining $1 million will be used to erect 12 oil storage tanks at the port of Aqaba with a capacity of about 15,000 tons of oil products. These tanks are now being built by a West German firm.

The Jordan government proposed a special group company, the United Petroleum Co., with responsibility for import and storage of fuel. Present distributing companies will participate.

OIL LAWS*

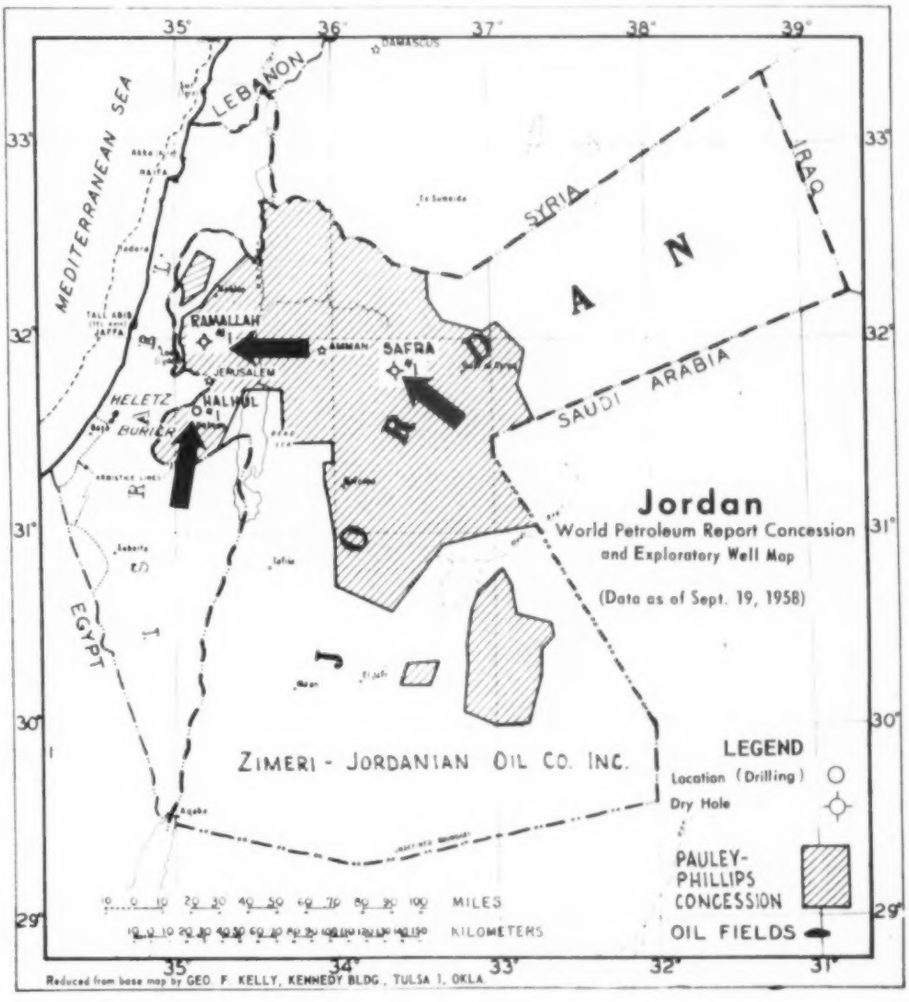
There is no oil law at present. Concessions are granted after separate consideration by the government. For summary of the Pauley concession, see *World Petroleum Report—1958*.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

ZIMIRI CONCESSION SUMMARY†

Signed November 28, 1957. Ratified by Law 21 of 1958. Reportedly thereafter assigned to USA group with Zimiri retaining 1½% overriding royalty and 5% participating interest. The 55-year oil agreement includes a six-year exploration period, renewable for another four years. **Annual fees**, payable in advance, start at $75,000 for the first year; $75,000 in each of the next two years, $100,000 in each of the next three, and to $200,000 yearly for the seventh to the tenth years. **Obligated** to drill 30,000 ft annually after September 1959. Up to that point, the company is required to do

(Continued)



JORDAN ***(continued)***

geophysical work on 8,490 square miles and seismic work on 386 square miles. When **production** is achieved, the government will get a straight 50% of the **net profits,** with the net to be calculated after recovery of all costs of exploration and operation.

The government has an option to take a 16⅔% **royalty.** If it does so, the company also may take 16⅔% before computing the net profits.

† Copies of these concessions are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y.

CAGNASCA CONCESSION SUMMARY†

A 58-year concession agreement covering about 11,580 square miles was signed, March 22, 1958, by Nino Cagnasca's representative, the Arab Trading & Development Co. Ltd., of Amman. The agreement provides for 50-50 profit-sharing and no cash bonus or concession fee. Jordan gets an 18% royalty in oil. The agreement provides for one year's prospecting time. During the second year, Cagnasca must drill two wildcats, and the same each year for six years. If commercial oil is found, he has to pay the government US $50,000 for each of the first three years after signing the contract; US $100,000 in each of the next three years; and US $200,000 for each year after that.

NATIONAL FACTORS

The attitude of Jordan is favorable to international investment, although the political situation is uncertain. One of the West's principal bastions against Nasser and communism, Jordan's King Hussein was forced to invite the protection of British paratroopers during the upheaval in Iraq, and he has failed in his move to take over the short-lived Arab Union between Iraq and Jordan. However, he keeps the support of the Bedouin tribes which compose 50% of the army; and as long as he maintains that, he can remain in power.

The unit of currency is the Jordan dinar, valued at US $2.80. There is little exchange control and, under the Law for the Encouragement of Foreign Capital Investment, effective May 1, 1955, profits from approved foreign investments can be remitted freely in the original currency of investment. Capital is freely remittable after one year. Pauley has received an ICA guarantee against expropriation, currency devaluation, and war risk. END

KUWAIT

PHYSICAL DEVELOPMENT

EXPLORATION:* No new discoveries have been reported since Raudhatain (see *World Petroleum Report—1957* and *1958* for review of drilling history). During 1959, Kuwait Oil Co. started production at Raudhatain field, with 20 wells to be completed by year's end, averaging 5,000 b/d to 7,000 b d apiece. Late 1959 or early 1960 will bring Raudhatain output to over 100,000 b d.

Kuwait Oil Co. is currently completing its eighth, ninth, and tenth wells at Raudhatain, with levels around 8,500 ft (deeper than the 4,800-ft production at Burgan, in southern Kuwait).

KOC drilled a second wildcat in the Sabriya area, nine miles southeast of Raudhatain, during 1958. No. 1 Sabriya was carried to 8,500 ft, and was a small producer. It may have been unfavorably located on a structure which is probably separate from that at Raudhatain. No. 2 well is due north of No. 1, and due east of Raudhatain.

The company has no plans to develop the Bahra area, where a test drilled over a year ago, some 20 miles southeast of Raudhatain, had doubtful commercial possibilities.

A single wildcat drilled at Mutriba, 30 miles southeast of Raudhatain, was dry.

A wildcat, Mina Gishi, drilled in southwestern Kuwait, was at 7,000 ft early in February 1959 with no report on results.

No activity was reported on the offshore area of Kuwait which is still open (beyond the 6-mile offshore limit of KOC's concession). Jersey Standard and Shell are reportedly interested, among others, but the government is in no hurry to let contracts. Terms under which contracts may be let have been published by the government.†

PRODUCTION: During 1958, production rose to average 1,399,385 b d, highest in the Middle East. During November 1958, it was already at an all-time high of 1,502,549 b d.

Kuwait is one of the world's best areas for oil production. While crude is not of the best quality, it is sweet and produces from sands, not limestone; therefore, it needs less repressuring. Ultimate recovery is probably the highest in the Middle East. KOC plans to put in operation in the Burgan field by mid-1959 what will ultimately be one of the largest gas-compressor plants in the Middle East. First stage will comprise the activation of two compressors, each driven by a gas-combustion turbine of 7,000 hp. Total volume of gas to be compressed and injected will be about 100 mmcf per day. After study of the first plant, a second of equal capacity is planned.

* Kuwait Oil Co. is the only operator in Kuwait at present. For operations in the Neutral Zone, see that section.

† Draft of Concession Terms Acceptable to Kuwait and Other Companies (dated 1956). Copy kept on file by *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y.

KUWAIT — Oil Data

Specific gravity, at 60/60 F	0.866
Viscosity, Redwood, at 100 F, sec	52
Sulfur, % by weight	2.4
Reid vapor pressure, at 100 F	10.1
Pour point, F	0
Asphaltenes, % by weight	1.0
ASTM Distillation:	
Initial boiling point, deg C	38
5% by volume recovered at (deg C)	84
10% by volume recovered at (deg C)	117
20% by volume recovered at (deg C)	173
30% by volume recovered at (deg C)	230
40% by volume recovered at (deg C)	387
Volume recovered at 300 F, %	43
Residue, % by volume	56
Loss, % by volume	1.0

Raudhatain development is one of the outstanding events of 1959. Indicated minimum north-south length of the field in early 1958 was 5½ miles, the indicated width 3¾ miles from east to west. Thus, a field underlying at least 13,000 acres is envisioned. A net thickness of 1,500 ft of effective oil sands in the Burgan and Zubair sandstone zones was reported. If these sand zones are as productive on a per acre-foot basis as may be reasonably expected from productive characteristics experienced elsewhere in this particular trend, a likely reserves figure of 9.75 billion barrels can be calculated for Raudhatain.

Crude producing capacity in Kuwait rose in 1958 with the opening of two new gathering centers in Burgan field. Each of the stations can handle 180,000 b d. KOC plans to step up its current output to a possible 1.7 million barrels per day in 1959. This would include added production from southern Kuwait. Loading capacity at the Mina al Ahmadi oil port was boosted to a maximum 2½ million barrels per day, with completion of a new pier in December 1958.

Reserves: Total proved reserves within Kuwait proper, not including the Neutral Zone, are estimated at 58 billion barrels.

REFINING: There is one major refinery in Kuwait, (for refineries of Neutral Zone companies, see that section), the 190,000 b d plant belonging to KOC at Mina al Ahmadi. It was recently expanded from 30,000 b d, mainly to provide

(Continued)

KUWAIT — Drilling 1936-58

Year	Number Commercial Wells: Exploratory	Number Commercial Wells: Productive Development	Number Noncommercial Wells: Exploratory	Number Noncommercial Wells: Productive Development
1958	1 (SA.1)	40	1 (MU.1)	
1957	1 (RA.2)	48		
1956		26		1 (MG.41)
1955	1 (RA.1)	21		1 (MG.36)
1954		13	1 (UG.1)	
1953	1 (AH.2)	17		
1952	2 (MG.1; AH.1)	19		
1951		19	[b]	
1950		13		
1949		49		
1948		24		
1947		5		
1938-42	[a]	8		
1936-37	—	—	1 (BA.1)	
Totals	6	302		

[a] BG.1, drilled in 1938, was not completed for production until 1953. [b] A deep test well, DT.1A, was drilled in Burgan to 13,853 ft, but found water; later completed development well (BE.113).

BG.	220	(Burgan field)	MU — Mutriba
MG.	43	(Magwa)	RA — Raudhatain
AH.	32	(Ahmadi)	SA — Sabriya
NK.	4	(North Kuwait)	UG — Umm Gudair

NOTE: The four wells in North Kuwait field are three exploratory wells: RA.1, RA.2, SA.1, as well as another well at Raudhatain which is contained in total of 40 development wells drilled in 1958.

KUWAIT ***(continued)***

increased quantities of diesel, distillate fuel, and residual fuel oils for ships' bunkers, but also various products for export. Products yields will be about 20% to 25% gasoline 10% to 20% middle distillates, and 50% to 60% heavy fuel oils. A Platformer was added to raise the octane rating of motor gasoline to meet a fast-growing local demand.

Typical Yields Obtained on Thermal Reforming of Kuwait Naphtha

	Yield % by Volume	Yield % by Weight
Methane and hydrogen	1.8	2.2
Ethane	2.4	3.3
Ethylene	0.6	1.7
Propane	2.5	3.5
Propylene	2.4	4.3
C4's	2.2	4.0
Gasoline (10 lb RVP)	82.0	77.0
Gas oil	5.5	3.0
Loss	0.6	1.0
	100.0	100.0

Typical Yields Obtained on Catalytic Reforming of Kuwait Naphtha

	Case I % by Weight	Case II % by Weight	Case III % by Weight
Hydrogen	0.5	0.5	
CH_4	0.3	0.5	2.8
C_2H_6	1.1	1.8	
C_3H_8	3.4	5.2	5.2
C_4H_{10}	5.0	8.1	2.6
C5 - 215C	89.7	83.9	89.4
	100.0	100.0	100.0

MARKETING: Kuwait Oil Co. exported 405,246,949 bbl of crude oil during 1957, with the United Kingdom the largest single destination. Distillate exports for the year were 997,550 bbl. Destinations of the crude oil were:

Destination	*Barrels*
United States	62,239,099
United Kingdom	135,215,759
France	45,877,610
Netherlands	34,006,099
Australia	13,097,786
Argentina	13,641,636
Japan	19,811,144
Belgium	3,087,999
Brazil	8,165,128
India	6,716,699
Italy	29,393,243
Other countries	13,980,869
UK-Continent	1,245,675
Aden	12,349,001
Sweden	1,004,879
Canada	2,776,983
Germany	496,514
Indonesia	857,387
Canary Isles	1,283,469

KOC has increased facilities with five sea berths—each berth fitted with two submarine lines. Two further sea berths were installed, each with two submarine lines. A new 32-in.-gravity line was laid to connect the tank farm at Mina al Ahmadi with the oil-loading berth.

OIL LAWS*

Controlling Statutes:* There is no central law governing oil exploration and development; instead, regulation is provided by a concession contract and other documents. Some of the principal ones are as follows: Concession Agreement between Kuwait Oil Co. Ltd. and His Excellency Sheikh Sir Ahmad al-Jabir as-Subah, dated December 23, 1934 (English); D'Arcy Kuwait Co. Ltd.-Gulf Kuwait Co.—His Highness Sheikh Abdulla as-Salim as-Sabah, Agreement of 1951; Memorandum of Agreement of May 14, 1955, between Kuwait Oil Co. Ltd. and the Sheikh of Kuwait; Letter from Kuwait Oil Co. Ltd. to Sheikh of Kuwait concerning Decree No. 5 of 1951; Agreements concerning volume discounts.

For a summary of the concession terms in Kuwait, see *World Petroleum Report—1958.*

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

Governmental Attitude: In response to a questionnaire, the State Secretary of Kuwait defined Kuwait's policy toward future international oil investors as follows:

> "The attitude of the government of Kuwait towards the investment of foreign private capital in its oil industry depends on the circumstances of the time and of the then foreseeable future. In the past, as readers of *World Petroleum* are aware, oil concessions have been granted to Anglo-American, American, and Japanese companies. Any decision on a future grant of an oil concession, and its development, will be made by his Highness the Ruler after due consideration of all relevant facts and circumstances."

OIL'S IMPORTANCE TO KUWAIT

The relative importance of oil in Kuwait is shown by the following estimates, received from the government's Finance Department, June 18, 1958: (1) The entire energy supply of Kuwait is derived from petroleum and natural gas. (2) Approximately 90% of total government revenues within Kuwait are supplied by petroleum operations. END

LEBANON

PHYSICAL DEVELOPMENT

EXPLORATION: There is no drilling going on in Lebanon. For a historical review, see *World Petroleum Report—1957.* Two concessions, one to Cie. Libanaise des Pétroles, the other to a Mr. Abdeni (see *WPR—1957* for map) have been granted. Cie. Libanaise reportedly is offering a deal whereby the drilling contractor would put up the drilling cost for a share of the profits; also, it is considering calling for bids to drill on a straight cost-per-foot basis. The company has few tangible assets, but it has connections which might make it hard for another company to obtain concessions from the government.

According to an official Lebanese source, a Lebanese-USA group has obtained two four-year exploration consessions.

PRODUCTION AND REFINING: There is no production, and only two refineries. One is at Tripoli (11,500 b d skimming capacity), and is owned by Iraq Petroluem Co. The other is at Sidon, owned by Mediterranean Refining Co. (50% Caltex, 50% Socony Mobil) with 12,500 b d capacity, including 1,400 b d reforming capacity. Throughput at oil refineries at Tripoli and Sidon during 1957 was 3,586,635 bbl and 3,955,104 bbl, respectively. Some products went to Syria and Jordan. Marketers in Lebanon also imported products not available from the two plants.

TRANSPORTATION: Lebanon is crossed by two huge pipelines from Iraq and, by Tapline, from Arabia (see Oil Laws section this report for concessions; also see *WPR-1957*). Tapline crude deliveries from Sidon, Lebanon, in 1958 averaged 368,049 b d, compared with 343,373 b d in 1957. Tapline's capacity was recently increased to 450,000 b d.

Iraq Petroleum Co. has a throughput capacity of over 500,000 b d, and anticipates 720,000 b d by October 1959. About 175,000 b d of present capacity goes through Tripoli; the rest to Banias in Syria. The increased capacity was on the segment to Banias, Syria, rather than to Tripoli, Lebanon. During June, IPC's pipeline to Tripoli was blown up by Lebanese rioters, but later repaired.

MARKETING: Consumption is about 20,000 b d. There are substantial imports of products which the two refineries do not produce. Such imports are valued at about 10 million Lebanese pounds a year.

LEBANON—Estimated Product Sales, 1957

	Thousands of US Barrels
Gasoline	673.5
Kerosine	255.2
Gas oil	929.6
Fuel oil	1,072.4
Avgas	417.0
Jet fuel	97.5

OIL LAWS*

Controlling Statutes* are Decrees No. 113 LR and 133 LR of August 9, 1933, and June 23, 1936. A copy of the concession of the Cie. Libanaise is kept on file.

Negotiations on the oil-transit agreements, under which the pipeline companies operate, have been dragging on for years. IPC has offered to pay on a "ton-mile" basis, Tapline has offered to split profits "50-50" between the four countries the line crosses. At the end of 1958 no agreement had been reached.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

The country went through a great period of political turmoil which ended in the landing of US Marines to restore order. President Chehab appears to have restored some sense of order, but confidence in political stability has not yet returned. The attitude of the new government is still to be determined as it affects petroleum investment in general; however, it appears favorable. There are no restrictions on foreign ownership, and private enterprise is encouraged as a matter of historical tendency.

The Lebanese pound is valued at $2.19 per US dollar (official rate). However, all transactions take place at free market rates which are now about 3.15 per dollar. There are no restrictions of any kind on import or export of currencies.

Income tax on corporations ranges from 5% on $2,280 income to 42% on income over $114,000. Exemption of six years from the tax is allowed certain industries (see *WPR—1957*). END

MUSCAT & OMAN

PHYSICAL DEVELOPMENT

EXPLORATION: There are only two companies working. Iraq Petroleum Co. is drilling through its subsidiary, Petroleum Development (Oman) Ltd. in the north (see map); and Cities Service is drilling in the south, in Dhofar province.

Cities Service wells and results are shown on the accompanying map. The company is using two rigs; but, if no commercial oil discovery is made, it probably will abandon the area and concession in about two years. Wells No. 1 and 2 Marmul were originally announced as discoveries; but, on test, production rapidly declined to "an uneconomic level." A third well drilled on the same structure encountered some oil and water, but was abandoned at 3,600 ft. Another deep test, seven miles northwest of Marmul—No. 1 NW Marmul—proved dry. It was abandoned at about 11,000 ft.

The company gave up on the Marmul structure, and drilled 30 miles southwest of Marmul, at No. 1 Ara, on a new structure. It went to about 11,000 ft and found numerous oil shows, but was abandoned. Another well, on the same structure, west of Ara, went to about 11,000 ft and found oil shows, but also was abandoned.

Cities Service is now drilling GM No. 1 well, which was at about 9,000 ft, recently; and also MIO No. 1, which was at about 7,000 ft. Oil shows were reported by the company in both.

The drilling crews have not as yet been able to put together the essentials of an oil field: porosity, good water drive, and oil. They have found all three, but none in a single well.

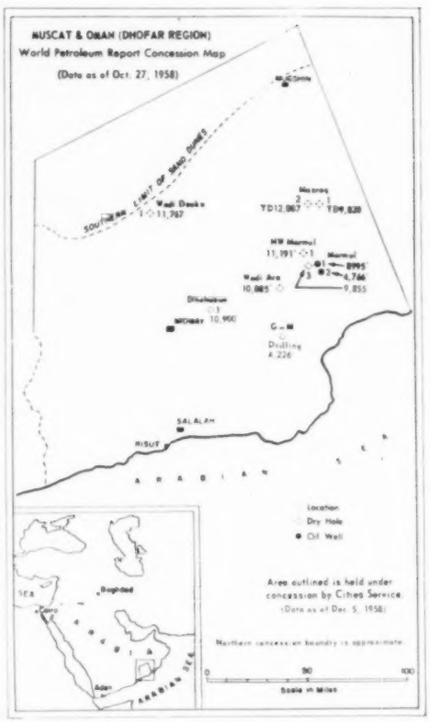
An important exploratory well, Ghaba No. 1 (formerly Gharb) is being drilled by Petroleum Development (Oman) Ltd., about 85 miles southeast of Fahud. It was spudded, March 3, 1958, and reached 12,275 ft by December 1, 1958. No shows were reported.

OIL LAWS

Concession texts on these areas have never been released; however, a summary of the Cities Service concession was obtained from the company and published in *World Petroleum Report—1958*. The IPC concession is believed to be of the simple agreement type, with provision for negotiation of a conventional type of agreement when and if discovery is made.

NATIONAL FACTORS

The difficult topography makes operations slow and expensive, especially in Oman where IPC is operating. During 1958, two bombs reportedly were thrown at the IPC camp at 'Uthaibah, with damage to equipment. This is part of the continuing strife between the rebel leaders, Imam Ghalib and his brother Talib, and the Sultan.



NEUTRAL ZONE

PHYSICAL DEVELOPMENT

There are two Neutral Zones, the Kuwait-Iraqi and the Kuwait-Saudi Arab. This review covers only the Kuwait-Saudi Arab Neutral Zone. There is no activity in the other, which is held by Arabian American Oil Co. under concession. Some reconnaissance work has been done there, but no drilling.

EXPLORATION: History of drilling is covered in *WPR—1957*.

News was made by the Arabia Oil Co., the Japanese company which received a concession over the Kuwaiti half of the offshore Neutral Zone during 1958 and over the Saudi Arab half during 1957, under the name Japan Petroleum Trading Co. Ltd. The company signed a drilling contract, November 23, 1958, with International Drilling Co. of The Netherlands, and expects to begin drilling in April 1959 in block "A," the southwest corner, and to complete five wells in 1959. The Japanese government has approved the agreement. Company spokesmen were already giving estimates as to production in 1964. While this seems premature, there is little doubt the area has excellent possibilities, especially with the Safaniyah field nearby.

The company started three months' seismic work in August 1958, a month behind schedule, and said that three large structures had been located. The company is primarily a speculation, and has to raise an estimated cost of $15 million to $20 million for exploration, plus $1.5 million annual rental each to Saudi Arabia and Kuwait. The Japanese government approved a loan of 2.5 million pounds, and the rest remains to be found among private investors. Kuwait and Saudi Arabia each has a 10% interest in the venture (see Oil Laws section). The Kuwait half of the area is held by the same company under the name Japan Petroleum Export Co.

KUWAIT-SAUDI ARABIA NEUTRAL ZONE—Wells Drilled

Year	Oil	Gas	Dry	Total
1950	—	—	3	3
1951	—	—	1	1
1952	—	—	1	1
1953	5	—	—	5
1954	12	—	3	15
1955	13	—	2	15
1956	27	—	2	29
1957	47	—	7*	54
1958	34	—	8*	42†

*Wells will be retested with possible change of status.
†To Nov. 1, 1958.
Source: Aminoil.

PRODUCTION: Fifty-four wells were completed in 1957, and 49 in 1958—43 in the Eocene and 6 in Ratawi. The companies were busily exploring a large extension area to the west of the Wafra field which appeared to have possibilities for Eocene production. The companies did no exploration work in 1958.

Production from the Wafra field during 1958 was 29,310,000 bbl, or an average of 80,307 b d. Of the total production, 14,246,000 bbl was produced from the Burgan sand; 7,224,000 from the Ratawi oölitic limestone; and 7,840,000 from the shallow Eocene zone. Eocene production more than tripled in 1958, and Ratawi doubled. At the end of 1957, there were 115 producing wells with a productive potential of about 112,000 b d.

Production from the Wafra field is from three different zones. The shallow Eocene zone, on which Getty has been concentrating, yields 16-gravity sour crude. The Burgan sand produces sweeter 24-gravity oil. The deeper Ratawi limestone also yields 24-gravity sour crude. There are 45 Burgan wells, 9 Ratawi, and 65 Eocene. The latter two crudes, being sour, will be processed at the new refinery installations of both companies.

Production in the Neutral Zone in 1958 averaged 80,300 b d. In December, it had reached average 104,170 b d.

Reserves: In March 1958, DeGolyer & MacNaughton estimated reserves in the Wafra and Fuwaris structures at 13.5 billion barrels—the first Eocene limestone at 1,000 ft containing 8.8 billion barrels; the second Eocene at 2,000 ft with 1.43 billion; the Burgan sand at 3,500 ft with 1.17 billion; and the Ratawi limestone at 6,800 ft with 2.1 billion barrels. The productive limits of the Eocene and Ratawi zones have not yet been established, and there are also indica-

(Continued)

NEUTRAL ZONE *(continued)*

tions that a zone at about 2,700 ft is oil-bearing.

REFINING: Aminoil and Getty ship from separate terminals on the Persian Gulf, and each is building a crude-stabilization and fuel-oil plant at its terminal. Getty has a 50,000 b d plant at Mina Saud in the Neutral Zone, and Aminoil built a 30,000 b d topping plant at its terminal at Mina Abdulla in Kuwait. Both the plants were built to comply with the refining requirement contained in their companies' respective concessions. The Aminoil plant is built for later expansion, and is designed to handle the high-sulfur crudes. Getty's plant is not as yet onstream, although it was completed in 1957. Operations were delayed when pipe for an 18-in. 32-mile pipeline from the Wafra field was found to be defective. It is now operating.

Two new offshore loading lines were added by Aminoil, while pipeline capacity from Wafra was boosted 150% to 80,000 b d by looping. The offshore lines, each two miles long, will supplement the existing 16-in. line. One is a 24-in. crude line; the other a 12-in. bunker line.

Aminoil's program also included a new 12-in. pipeline paralleling the existing 8-in. and 10-in. line from the Wafra producing field to the refinery and shipping terminal at Mina Abdulla. A new pumping station with four 1,000-hp pump units was constructed at Wafra. Tankage additions at the Wafra field, the refinery, and the shipping terminal totaled 1,180,000 bbl. A 270,000-bbl reservoir also was constructed to store fuel oil.

MARKETING: Exports in 1957 were 22,696,000 bbl, of which 13,979,000 bbl were lifted by Getty and the remainder by Aminoil. The main destinations of the oil were the USA, 13,319,000 bbl; Japan, 5,077,000; and Italy, 2,738,000. Marketing is done independently by the two companies, much of the Getty oil going to the USA, while Aminoil sells where it finds buyers. Getty Oil Co. exports of crude from the Kuwait-Saudi Arabia Neutral Zone during the first six months of 1958 were 7,098,287 bbl; American Oil Co. 5,001,728 bbl. Of Getty's exports, 6,803,115 bbl went to USA and 295,172 to Japan. Of Aminoil's exports, 994,821 bbl went to USA, and the rest to Japan (1,233,437), Netherlands (551,660), Italy (588,080), and France (1,633,730).

Initial posted prices for crude oils from the Saudi Arabia-Kuwait Neutral Zone were announced by Getty Oil Co., effective August 14, 1958, f.o.b. Mina Saud: Burgan, 23.5-24.4-gravity, is $1.61 per barrel; and Eocene-Ratawi, 20.5-21.4-gravity, is $1.43. Prices escalate above and below the postings given by two cents per barrel for each whole degree of gravity variation.

OIL LAWS

There is no oil law for the Neutral Zone. All work is done under concession contract with Kuwait or Saudi Arabia. A complete résumé of the Getty Oil (formerly Pacific Western) concession is contained in *World Petroleum Report —1958*. The other three concession contracts are summarized herein. Attention is called to the Japan Petroleum Trading Co. Ltd. agreement with Saudi Arabia, and to the Aminoil agreement, which have never been printed. These concessions have been translated and are kept on file at the New York offices of *World Petroleum Report*, as well as a copy of the Aminoil concession.

A number of other companies, including Hunt Oil and Pan American International Oil Co. (Standard of Indiana), were bidding in Kuwait against the Japanese. The government evidently considered it more worthwhile, however, to grant the concession to the same company which had obtained it for the Saudi Arab half. There are some novel provisions, as can be seen in the following summaries. Most novel is the provision for government participation (10% in both Kuwait and Saudi Arabia), for 56% in Saudi Arabia and 57% share in Kuwait of government profits. There are other unusual provisions as well.

NEUTRAL ZONE—Comparative Summary of New Offshore Concession Terms (As of July 30, 1958)

JAPAN PETROLEUM TRADING CO. LTD., Saudi-Japanese concessionaire (Arabian American Oil Co. Ltd. operator)—**Date of Agreement:** 12-10-57. **Area:** All Saudi undivided half-interest in offshore area of Neutral Zone. **Relinquishment:** 20% three years after discovery commercial production and 20% every 5 yrs. thereafter. **Term:** 2 or 4 yrs. exploration plus 40 yrs. exploitation. **Renewal:** Company has preference renewal over all others except Saudis. **Government Ownership:** 10% of capital stock after commercial production. **Rental:** $1.5 million annually, creditable against royalty when in commercial production; $1 million retroactive to effective date on commercial discovery of oil. **Bonus:** None initially; after commercial production, retroactive rental as above. **Local Tax:** 56% (now 57%?) including royalty. **Special Tax Provisions:** Tax on all operations, including transportation and marketing, even outside Saudi Arabia. Exploration costs, rentals in exploration period, and bonus before commercial production not deductible. **Royalty:** 20% crude, gas, and asphalt production—in kind or cash. After commercial production, $2.5 million per year minimum. **Minimum Work Expenditure:** None. **Ownership of Oil:** Japan Petroleum Trading. **Marketing:** Posted crude prices and product prices to be agreed with government. **Tanker Obligation:** First preference to Saudi-owned ships (govt. or nationals). **Drilling Obligation:** Two rigs in continuous operation until area entirely drilled up. **Refinery Obligation:** Construction of refinery when production from Saudi interest reaches 30 million b d; increase to capacity of 30% of crude when production reaches 75 million b d. **Oil for Internal Consumption:** Max. 10% value of crude and products, purchasable at 5% discount; further 10% for resale to friendly Arab countries. **Oil in Kind:** 20% royalty in kind at govt.'s option. **Local Participation in Management:** Saudi govt. nominates 1/6 directors. **Gas-Utilization Facilities:** Company to establish gas plant for petrochemical industry.

ARABIAN AMERICAN OIL CO. LTD. (Kuwait-Japanese concessionaire; and operator)—**Date of Agreement:** 7-5-58. **Area:** All Kuwait undivided half-interest in offshore area Neutral Zone. **Relinquishment:** Same as Saudi (see above). **Term:** 44½ yrs. **Renewal:** Company has renewal preference over all except Kuwaitis. **Government Ownership:** Same as Saudi (see above). **Rental:** Same as Saudi. **Bonus:** None initially; retroactive rental same as Saudi (see above), plus $5 million when production reaches 50 million b/d. **Local Tax:** Govt. "take" paid as royalty; 50% tax and whatever "makeup payment" may be required. **Special Tax Provisions:** Govt. "take" calculated separately on oil profit and marketing profit. Minimum receipts on oil profit to be the greater of: (a) min. royalty of $2.5 million per year, or (b) 57% of oil profit; or (c) 20% royalty on crude, asphalt, and gas plus 40% of amount by which oil profit exceeds the 20% royalty. Minimum receipts on marketing profit to be 57%. **Royalty:** Same as Saudi (see above). **Minimum Work Expenditure:** None. **Ownership of Oil:** Arabian American Oil Co. **Marketing:** Same as Saudi. In addition, selling charge and volume or other discounts to be agreed. **Tanker Obligation:** Favorable consideration to use of ships owned by Kuwaiti nationals, at current market rates. **Drilling Obligation:** Commence test well within 2 yrs., and continue to aggregate 20,000 ft or discovery. Thereafter two rigs in continuous operation. **Refinery Obligation:** Company will discuss (considering economic factors) construction of refinery when production from Kuwait interest reaches 30 million b/d. If Sheikh requires, increase to 30% of crude when production reaches 75 million b d. **Oil for Internal Consumption:** Same as Saudi. **Oil in Kind:** Same as Saudi. **Local Participation in Management:** Kuwait govt. nominates 1/6 directors. **Gas-Utilization Facilities:** Company to establish plant. **Other:** After production exceeds 30 million b d, Company to establish and maintain institute for study of Kuwait natural resources and water supply.

AMINOIL CONCESSION

Date of Agreement: June 28, 1948. **Area:** Kuwait's undivided half interest, including all islands and territorial waters. **Duration:** 60 years. **Operations:** Within nine months, commence geological and geophysical exploration, and drill (1) 4,000 ft prior to the 4th anniversary, (2) 16,000 ft prior to the 10th anniversary, (3) 40,000 ft prior to the 20th anniversary. **Payments:** On signature, $625,000; 30 days after signature, $7,250,000. On each anniversary, either royalty of $2.50 for every English ton of production, or $625,000. **Royalty:** 1/8th of gross proceeds. **Government Participation:** 15% of shares of a subsidiary formed to explore and exploit. **Refining:** When daily production reaches 15,000 tons (about 111,250 bbl), company must construct refinery with capacity of 10% of production. Refinery to be owned by a company of which The Sheikh shall receive 15% of shares. **Harbors:** Company may use harbors of Neutral Zone. **Representative:** Sheikh's foreign representative paid by the company. **Imports:** Right to import equipment etc., and export petroleum free of duty on payment of 7½ cents per ton of petroleum on which royalty is payable. Employment: Employ Kuwaitis but, if unsuitable, may import labor. **Medical:** Company provides free medical services. Within four years, company must construct modern hospital of 30 beds; also a program of education for Kuwait nationals. **Surrender:** Any time after drilling of 4,000 ft or after two years. If occurs within 35 years, all immovable property handed to the Sheikh free. If after 35 years, all movable and immovable property handed over to Sheikh free. **Transfer:** Only with written permission, and only to purchasers registered in USA or Britain. It is further agreed between the Sheikh and the company that the Sheikh has first option. **Termination:** Sheikh may not by general or special legislation or by administrative measures, or by any other act whatever, annul agreement. No alteration shall be made unless desirable to both parties. **Disputes:** Referred to two arbitrators, and to a referee. **Language:** Written in English and translated into Arabic. English text prevails END

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QATAR

PHYSICAL DEVELOPMENT

EXPLORATION: There is little exploration onshore, where production was established in 1939 (see *WPR—1957*), but Qatar Petroleum Co.'s heavy rig spudded Dukhan No. 65 in July 1958. As of January 15, 1959, casing was cemented at 2,258 ft, and the well is drilling ahead. Projected depth is 15,000 ft to 20,000 ft. Deeper productive horizons are being sought within the 20-mile-long Dukhan anticline. No results have been announced. One seismic party operated onshore during 1958.

Interest has centered on offshore areas, outside the three-mile limit. There a marine concession was granted in 1949 to Superior Oil Co. and Central Mining and Investment, whose joint subsidiary, International Marine Oil Co., began work in 1950. The concession was surrendered the following year, without drilling. Shell acquired it, drilled two wells, and lost its offshore barge in a storm (see *WPR—1957 and 1958*). Shell did no drilling in 1957. The Das Island discovery stimulated interest in the area, however, and the company is now actively exploring again. All wells to date have been on the Das Island side.

Japan was reported, October 25, 1958, to have offered to explore in the offshore area. The offer was via the Japanese ambassador to the UAR.

PRODUCTION: During 1958, production from Dukhan, the only field, rose to 171,932 b/d, from its former record level of 140,701 b/d in 1957. There are about 50 wells in the field, of which about 40 are now producing, and the field is almost at its maximum. Proved reserves are estimated at 190 million tons (about 1.425 billion barrels). Gravity of crude is about 41.7 API, producing from an average depth of 6,500 ft.

QATAR—Crude-Oil Production, 1958
(Barrels Per Day)

January	156,400	July	175,539
February	163,100	August	166,051
March	182,531	September	171,328
April	181,245	October	164,300
May	171,044	November	185,519
June	158,426	December	187,704
	Year (1958)	171,932 b/d	

TRANSPORTATION: Production is taken across the peninsula (see map in *WPR—1957*) to Umm Said port via 14½-in. and 20-in. lines.

REFINING: Only refinery is a 600 b/d topping plant at Umm Said, which supplies local needs.

MARKETING: Exports were 6,448,352 long tons during 1957, and rose to about 7,930,297 long tons in 1958. During the first nine months of 1958, tankers loaded 5,947,723 tons.

Posted prices rose slightly in 1957. With change in Middle East postings by BP, as of February 13, 1959, 40-40.9 API gravity crude ex Umm Said was lowered to $2.03 per barrel from $2.21, 1958 level.

OIL LAWS

There is no oil law. Operations are conducted under a concession granted in 1935 to Petroleum Development (Qatar) Ltd., later called the Qatar Petroleum Co., an associate of the Iraq Petroleum group. It covers the mainland and territorial waters three miles out. No details of the concession have been released by the company.

Shell Co. of Qatar acquired a 75-year marine concession in 1952. No details on the concession terms have been released.

NATIONAL FACTORS

Relations with the Sheikh of Qatar have been harmonious, and oil revenues are among the highest in the Middle East, on a per-capita basis. In 1957, they amounted to 15.9 million pounds ($44.5 million), and have been wisely used—with half expended on local development and welfare and one-quarter invested for the future, the remainder going to the governing family and government expenses. END

SAUDI ARABIA

PHYSICAL DEVELOPMENT

EXPLORATION: Other than Aramco (whose operations are covered later in this report), no exploratory drilling was done during 1958, but three new concession arrangements were under way. Pan American International Oil Co., subsidiary of Standard of Indiana, was negotiating for the Preferential Area (see map; for a brief résumé of Aramco's concession provisions affecting it, see *World Petroleum Report—1957*, p. 236), but the company announced during October that the concession terms offered were "completely unacceptable." The requirements for complete integration and participation by the government in company operations, stretching back to its refineries in the United States, were believed to be the sticker. However, a compromise solution is under discussion.

Another concession of interest during 1958 was the one granted the Japan Petroleum Trading Co. Inc. For a review, see NEUTRAL ZONE, this report. Text of the concession is kept on file at the New York offices of *World Petroleum Legislation Report* (see p. 22 herein). Its provisions express better than any discussion the government's requirements for new concessions.

Ente Nazionale Idrocarburi (ENI), the Italian government's oil agency, appears likely to operate a new concession reportedly granted to SANE. This company is owned by the Italian government through Monte Amiata and SICEA, two other government companies which have, respectively, 36.88% and 63.12% of SANE's stock. Since SANE has no oil exploration experience and ENI is the government's oil agency, it appears likely ENI will operate the concession. Area involved is about 34,750 square miles along the Red Sea coast south of Jidda, off northwestern Assir province, including the Farsan Island group near the Yemen border.

Aramco Operations: All other activities in Saudi Arabia's oil are carried out by Arabian American Oil Co. (Aramco). Recent operations by the company follow.

Exploration:* Arabian American Oil Co.'s usual total of eight exploration parties worked in the outlying parts of the concession area during 1958.

Two significant changes were made during 1958 in the pattern of Aramco's exploration effort. One involved the discontinuance of the gravity-meter-magnetometer party at the end of its field season around the beginning of summer. This party had virtually completed

SAUDI ARABIA—Status of Wells
As of September 30, 1958

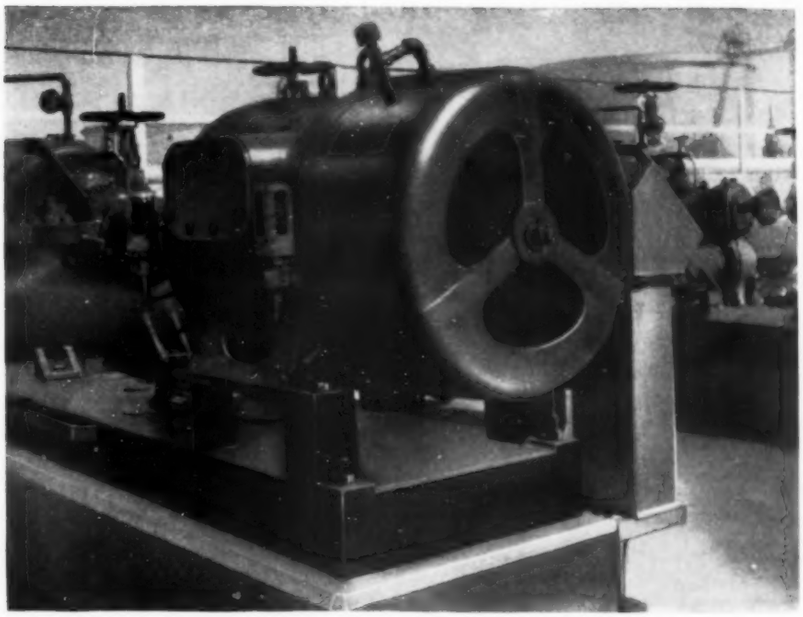
	COMPLETED								UNCOMPLETED	
Field	Producing	(Abandoned) Oil	Drilling	Standing [c]	Shut-in [d]	Observation	Injection	Total	Suspended	Drilling
Abqaiq	51	2	0	0	12	3 [g]	12	80	0	0
Abu Hadriyah	0	0	2	1	0	1	0	4	0	0
Dammam	28 [a]	7 [b]	3	1 [e]	2	1	0	42	0	0
al Alat	0	0	1	0	0	0	0	1	0	0
al Jauf	0	0	1	0	0	0	0	1	0	0
Fadhili	0	0	0	1 [f]	0	0	0	1	0	0
Ghawar:										
'Ain Dar	40	0	1	3	5	3	4	56	0	2
Shedgum	14	0	1	1	0	1	0	17	0	0
'Uthmaniyah	30	0	2	10	3	3	0	48	1	0
Hawiyah	0	0	0	1	0	1	0	2	0	0
Haradh	0	0	0	7	0	1	0	8	1	0
Fazran	0	0	0	2	0	0	0	2	0	0
Khurais	0	0	0	3	0	0	0	3	0	1
Khursaniyah	0	0	0	2	0	2	0	4	0	1
Ma'qala	0	0	1	0	0	0	0	1	0	0
Manifa	0	0	0	1	0	0	0	1	0	1
Qatif	10	0	1	0	0	1	0	12	1	0
Safaniya	17	0	0	14	1	1	0	33	0	0
Stratigraphic Well	0	0	1	0	0	0	0	1	0	0
Total	190	9	14	47	23	18	16	317	3	5

[a] Includes three producing gas wells.
[b] Includes two abandoned gas wells.
[c] Standing oil well has been completed as producer but is not connected to surface facilities.
[d] Shut-in oil well is not producing.
[e] Dammam well 43 suspended workover.
[f] Well bore filled with mud.
[g] Abqaiq well No. 2 is gas-cap observation well.

* For a brief review of previous exploration, see *World Petroleum Report—1957*, p. 233.

(Continued)

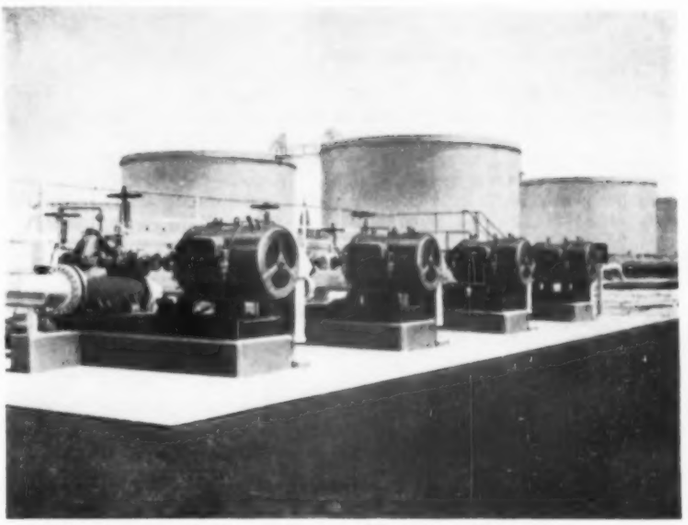
Flameproof Motors for the Oil Industry



A. Metrovick 250 h. p. 1480 r. p. m. Flameproof Squirrel Cage Motor—one of four supplied to the Kwinana Oil Refinery

Oil wells and refineries throughout the world rely on M-V equipment. Metrovick experience of motors and their proper application covers all drives in the oil industry, from drilling to refining. Some of the refineries using Metrovick motors are the Grangemouth Petroleum Refinery, Ltd., Shell Stanlow Refinery, Esso Refinery, Fawley, Trinidad Leaseholds Point-a-Pierre Refinery, B.W.I., and (illustrated) British Petroleum Company's Refinery at Kwinana, Australia.

Special arrangements were put in hand to guarantee that these motors were delivered to meet site requirements.



This photograph shows the four Metrovick Flameproof Motors driving kerosene pumps at Tank Farm Pumping Station No. 3. These motors are fitted with constant-level oil lubricators.

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Aramco's program for this type of regional reconnaissance survey. A new structure-drill party was organized in its stead. Thereafter Aramco maintained a total of four structure-drill parties and four seismograph parties.

The other change involved an increasing concentration of the exploration effort on the Rub' al-Khali, in line with Aramco's continuing objective of making a regional evaluation of the concession area. Three of the six parties exploring the Rub'al-Khali were equipped with the structure drill and three with the seismograph. The structure-drill parties centered their attention on the southwestern part of the "empty quarter." The seismograph parties operated in the southern and eastern reaches of this area. The easternmost seismic party was supplied 100% by air because of the extremely difficult terrain which it encountered in the sand-mountain area.

Outside the Rub'al-Khali, the fourth structure-drill party operated in the central part, and the fourth seismic party in the northern part of the concession area.

Drilling: During 1958 Aramco completed 23 deep wells, including discovery wells in the Khurais and Manifa fields. Five rotary rigs were in operation drilling new wells. Armco's proved remaining recoverable reserves of crude oil had been estimated at approximately 35 billion barrels as of the end of 1957. The completion of Khurais No. 1 was announced in March 1958. This wildcat, located in the Dahna sand belt about 20 to 25 miles inside the western boundary of the concession area and about 90 miles east of Riyadh, was completed for production from the Arab-D member of the Arab Zone, the principal producing zone in Aramco's onshore fields, which is of Upper Jurassic age. This well was plugged back to 4,975 ft after having reached a total depth of 10,621 ft. The crude oil from Khurais No. 1 is sour, with an API gravity of about 33.

Subsequently Khurais No. 2, four miles southwest, and Khurais No. 3, 5½ miles southeast of the discovery well, also were completed for production from the Arab-D member. As of September 30, Khurais No. 4 was drilling ahead in the neighborhood of 10,000 ft.

The completion of Manifa No. 1, Aramco's second offshore discovery in the Persian Gulf, about nine miles off the coast of Saudi Arabia, also was announced in March 1958. Completed through perforations from 7,715 ft to 7,800 ft and from 7,810 ft to 7,865 ft in the lower Ratawi Zone, this was the first well in Aramco's concession area to have discovered oil production from this zone, which has been identified as Lower Cretaceous. The well was drilled to a total depth of 9,637 ft, and was plugged back to 7,892 ft. It resulted in the discovery of oil in a number of other zones, including the A, B, and C members of the Arab Zone (the Arab-D member contained water). The crude from the producing interval at Manifa No. 1 is sour, with an API gravity of approximately 27.

Manifa No. 2 was spudded in, August 2, approximately 4½ miles southeast of the discovery. As of September 30, this well was drilling ahead in the neighborhood of 7,600 ft. The drilling of this well involved the use of Aramco's new mobile platform No. 1 in conjunction with the new drilling barge "Queen Mary."

Between the completion of Manifa No. 1 and the spudding of Manifa No. 2, five additional offshore wells were completed at Safaniya, Aramco's first offshore field, for production from the lower sands of the Bahrain Zone.

A new extension of the Ghawar field in a northerly direction also was indicated during 1958. During the previous year, 'Ain Dar No. 56, twelve miles north of the northernmost well in the 'Ain Dar area of the Ghawar field, had been completed for production from the Arab-D member. This well was located on a structural high near Jabal Fazran; during 1958, it was renamed Fazran No. 1. Fazran No. 2 also was completed in the Arab-D member in what became known as the Fazran area of the Ghawar field. With the completion of Fazran No. 2, six miles due north of Fazran No. 1, the length of the Ghawar field was estimated to be in excess of 150 miles.

Also during 1958, Khursaniyah No. 4 was completed as an observation well in the upper part of the Arab Zone. As of September 30, No. 5 well was being drilled in this field, which had been discovered in 1956.

Pressure Maintenance: Most of the rest of Aramco's drilling during 1958 was concerned with pressure-maintenance programs. In the Abqaiq field, Aramco completed three wells—one of them an oil well. The other two were the ninth water-injection well at the northern end of this field and the third gas-injection well at the top of the Abqaiq structure. In the Ghawar field, four of the planned seven gas-injection wells were completed in the 'Ain Dar area, and two more were under way on September 30.

The expansion of the gas-injection facilities at Abqaiq during the year brought their peak capacity to 210 mmcf of gas per day, in comparison with the actual average rate of 150,236,000 cu ft during 1957. The drilling of the third gas-injection well confirmed that the gas-injection program in the past had swept the crestal portion of the Abqaiq reservoir clear of oil. The completion of the water-injection facilities at Abqaiq raised their capacity to 300,000 b/d of water, in comparison with the actual average rate of 35,600 b/d during 1957. In addition, as of September 30, a pilot plant was virtually complete for testing the feasibility of injecting sea water from the Persian Gulf for pressure-maintenance purposes. This project's main installation is an intake station at the edge of Half Moon Bay, capable of drawing up to 50,000 b/d of sea water. The water will be filtered, de-aerated, and chemically treated before it is pumped 11 miles inland through a $10\frac{3}{12}$-in. pipeline to an Abqaiq injection well.

The gas-injection project for the 'Ain Dar area of the Ghawar field was scheduled for completion by the end of 1958. This project is designed to compress 200 mmcf per day of high-pressure gas from the four 'Ain Dar and one Shedgum gas-oil separator plants (GOSP's), and to inject this gas into the north and south domes of the 'Ain Dar area. It calls for the use of three gas-injection wells in the north dome and four in the south dome, and for the compression of the gas in five stages from 150 psi up to 2,000 psi. Included in the project are five combustion gas turbines and five centrifugal gas compressors, gas-gathering lines from the GOSP's to the gas-injection plant, gas-injection lines from the plant to the injection wells, and a 5,000-kw generator driven by a sixth combustion gas turbine for electrifying the GOSP pumps. The overall cost of the project is estimated at approximately $30 million. Besides conserving the gas produced in association with crude oil, the project will reduce the decline rates of the reservoir pressure and of well potentials in the 'Ain Dar area.

The 'Ain Dar and Abqaiq gas-injection facilities enable Aramco to utilize, for pressure-maintenance and power generation, an estimated 56% of the available gas produced in association with the crude oil in the concession area.

Reserves: Aramco's proved recoverable reserves, as of January 1, 1958, were estimated at approximately 35 billion barrels.

PRODUCTION: The average production of crude oil by Arabian American Oil Co. in Saudi Arabia during the first nine months of 1958 was 1,007,240 bbl per calendar day—slightly higher than the previous daily peak (on an annual basis) of 992,114 bbl during the 12 months of 1957.

During September, the Ghawar field, which has been on production only since 1951, passed Abqaiq in cumulative production to date. As of September 30, 1958, Ghawar had produced a total of 1,402,153,997 bbl, and Abqaiq 1,396,382,641 bbl.

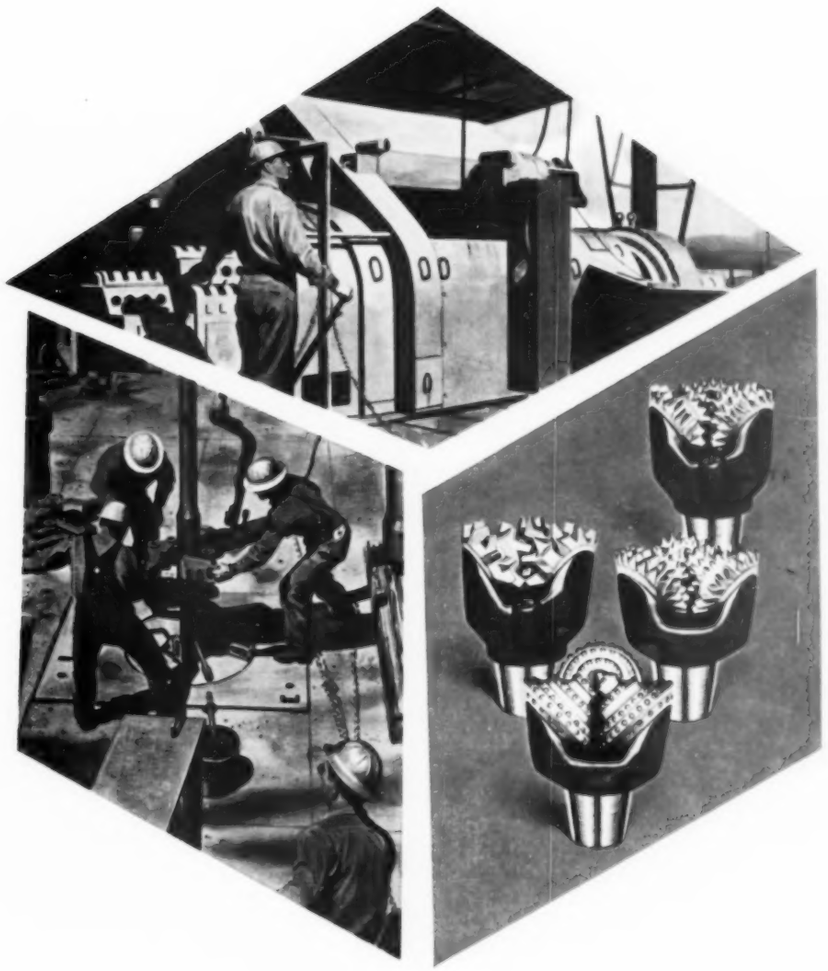
On September 30, 1958, Aramco had 190 producing wells, including 187 oil wells and three gas wells. Estimates of production increase show Aramco's production rising to about seven million barrels daily by 1980, a sevenfold increase.

(Continued)

SAUDI ARABIA — Characteristics of Oil Fields

Field	Producing Zones	Gravity, °API	Minimum Depth (Feet Below Sea Level)	Estimated Productive Area (Acres)
Abqaiq	Arab-D [1]	38	5,592	89,300
Abu Hadriyah	Hadriyah producible	36	10,000	Unknown
Dammam	Arab-A	35	3,940	11,600
	Arab-B	35	4,000	9,300
	Arab-C	35	4,170	7,100
	Arab-D	35	4,200	2,900
Fadhili	Fadhili producible	38	9,600	1,900
Ghawar:				
'Ain Dar	Arab-D	36	5,500	137,100
Shedgum	Arab-D	35	5,642	72,500
'Uthmaniyah	Arab-D	33	5,360	298,600
Haradh	Arab-D	33	5,064	47,400
Hawiyah	Arab-D producible	33	5,098	4,100
Fazran	Arab-D producible	38	6,500	5,100
Khurais	Arab-D producible	33	Unknown	3,200
	Mid-Jubailah producible	33	Unknown	—
Khursaniyah	Arab-A producible	31	5,880	4,900
	Arab-B producible	31	5,950	4,800
	Arab-C producible	31	6,010	3,400
	Arab-D producible	31	6,190	1,900
	Mid-Jubailah producible	31	6,580	—
Manifa	Upper Ratawi producible	31	Unknown	—
	Lower Ratawi producible	27	Unknown	500
	Manifa producible	30	Unknown	—
	Arab-A producible	28	Unknown	—
	Arab-B producible	28	Unknown	—
	Arab-C producible	29	Unknown	—
Qatif	Arab-C	32	6,850	21,300
	Arab-D	37	7,030	16,200
Safaniya	Bahrain	27	4,931	71,700
	Zubair	31	6,552	2,900

[1] Two wells at Abqaiq produce from the Mid-Jubailah and two from the Arab-C.



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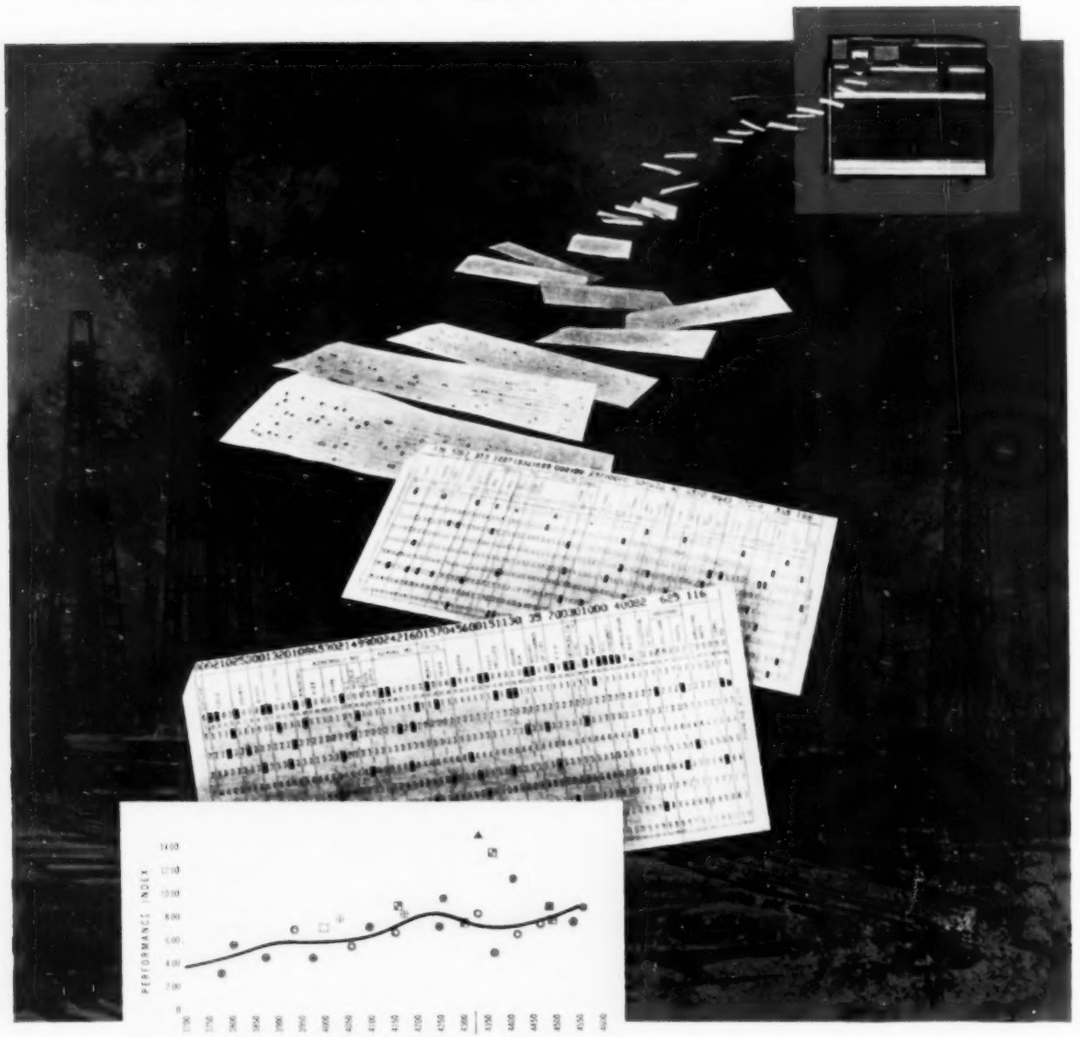

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SAUDI ARABIA — Crude-Oil Production, 1958

(Barrels Per Day)

January	978,401	July	1,046,180
February	1,062,999	August	990,901
March	1,050,954	September	1,079,976
April	928,307	October	1,045,439
May	979,526	November	1,034,223
June	951,313	December	1,034,639

1958 (year) 1,015,029 b/d

SAUDI ARABIA — Production by Fields

(Barrels)

	1957 Daily Average	Jan. 1-Sept. 30, 1958 Daily Average	Cumulative Production Through Sept. 30, 1958
Abqaiq	284,928	230,696	1,396,382,641
Abu Hadriyah	—	—	9,579
Dammam	39,709	38,297	378,729,132
Ghawar	586,349	681,529	1,402,153,977
Qatif	24,992	19,569	96,923,867
Safaniya	56,136	37,149	30,631,298
Total	992,114	1,007,240	3,304,830,494

REFINING: During 1958, the Aramco refinery at Ras Tanura on the Persian Gulf processed 168,119 bbl/day.

During this period, the company began construction of the first alkylation unit in Saudi Arabia. Located at the Ras Tanura refinery, this plant will enable Aramco to manufacture aviation gasoline instead of importing it into Saudi Arabia. Including related refinery additions and tankage, the avgas facilities are scheduled for completion about mid-1959 at an estimated cost of about $7 million. The alkylation plant will provide approximately 1,200 b/d of light alkylate for blending with other refined products to make up to 2,000 b/d of aviation gasoline.

Another addition to the Ras Tanura refinery, for processing and handling liquefied petroleum gas, was scheduled for completion by January 1, 1959. These new facilities are designed to raise Aramco's LPG capacity to 1,500 b/d, and involve an investment of $1,025,000. They are expected to meet the rising demand for this fuel within Saudi Arabia, and also to provide an exportable surplus. These facilities include three new vessels for storing LP Gas under pressure.

SAUDI ARABIA — Crude Runs to Stills

(Barrels Per Day)

January	186,320	July	163,445
February	181,684	August	157,195
March	216,212	September	166,284
April	169,589	October	168,281
May	168,047	November	143,163
June	134,289	December	162,324

TRANSPORTATION (Pipelines): In conjunction with the Trans-Arabian Pipe Line Co., Aramco completed during the first nine months of 1958 a major expansion of the throughput capacity of the trans-Arabian pipeline system. This system stretches 1,068 miles from Aramco's producing fields to the Tapline terminal at the port of Sidon, Lebanon, on the Mediterranean Sea. The expansion program, representing an investment of $21 million by the two companies, involved the installation of a series of pumping units powered by 5,000-hp combustion-gas turbines.

SAUDI ARABIA — Crude Deliveries by Trans-Arabian Pipe Line, 1958

	Barrels	Barrels Per Day
January	9,099,855	293,544
February	10,281,084	367,182
March	11,589,042	373,840
April	11,010,895	367,030
May	11,174,957	360,482
June	11,443,022	381,434
July	12,017,563	387,663
August	10,747,074	346,680
September	13,486,621	449,554
October	11,304,322	364,655
November	11,361,923	378,931
December	10,821,553	349,082

The completion of the expansion program raised the total capacity of the trans-Arabian pipeline system to approximately 460,000 b/d. These new facilities enabled Tapline to deliver an average of 449,554 b/d of crude from Sidon, Lebanon, during the month of September 1958. This was a new peak for Tapline for any one month. During 1958, Tapline's deliveries averaged 349,082 b/d. Average was 343,373 b/d during 1957.

OIL LAWS*

There is no oil law in Saudi Arabia as yet, although one is being formulated with the aid of an advisor, Mr. Frank Hendry (see below). Oil-producing operations within most of the country are presently governed by the terms of the Aramco concession,† as summarized in *World Petroleum Report—1957*, p. 233 and 236. For terms of the recent concession granted over the Saudi Arab half of the Neutral Zone, see that section in this volume. For terms of the Pacific Western (now Getty Oil Co.) concession over the Saudi Arab half of the onshore Neutral Zone, see *World Petroleum Report—1958*. The review contained there is also based on the original text of this agreement which is also kept on file at the offices of *World Petroleum Report*. Operations of Tapline, the pipeline company which transports for Aramco, are also governed by a concession agreement which is kept on file at the New York offices of *World Petroleum Legislation Report*.

Although terms of the new oil law have not been revealed, it is thought to be complete and only awaiting signature of the Pan American concession agreement over the Preferential Area. Based on press reports, the law will require: (1) 60-40 "integrated" profits split—which means the company must establish an integrated company from exploration through marketing and pay the tax on the net income from all operations; (2) a refinery construction obligation equal to a minimum of 30% of production—the Japanese agreement contains such a requirement (see Neutral Zone); (3) company must help start a petrochemical industry in Arabia; (4) it must be an Arab company, incorporated or at least domiciled in Saudi Arabia.

The government has made it clear that the tax referred to above will not be retroactive, so existing concessionaires (Getty, Aramco, Japan Trading) are not affected, but they will be under pressure for revision.

During 1958, an agreement was reached over the offshore areas between Bahrain and Saudi Arabia (see Bahrain section, this report, for its details).

The long-standing controversy between Aristotle Onassis and Aramco (see *WPR—1957*) was settled with a decision by the arbitration tribunal in Geneva, Switzerland, in late 1958. The decision ruled that the Onassis agreement for tanker transportation of Aramco's oil is in conflict with the terms of Aramco's concession.

*Translations fo the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation* Report, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

† A copy of this concession in its original text, with amendments through 1956, is kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N. Y.

NATIONAL FACTORS

On a net evaluation basis, the investment climate in Saudi Arabia is good. Among the favorable factors which might be mentioned are the country's undoubted oil potential, no exchange control, and a good investment history. There is even a pool of trained oil labor; Aramco has about 12,729 Saudi employees (69.5% of total work force), with an average 7.3 years of service; 28% of them have worked for the company at least 10 years, another 41% for 5 to 10 years. Operating requirements are reasonable, as may be seen in the résumé of Aramco's concession terms. Minimum daily wage is now $2.00 compared with $1.25 per hour in the United States.

Under these circumstances, the chief consideration is the political situation, coupled with the government's demands for revision of existing concession agreements. Aramco is being pressed to form an integrated company (Aramco does not hold the basic concession agreement; Standard of California does, and crude produced is sold to the partners who then post their own prices). If forced to do this, it would place Aramco in competition with its own parents and entail a great expense.

During early 1958, Crown Prince Faisal was appointed premier with practically unlimited powers. One of his first statements established Saudi Arabia's position as one of "positive neutrality." It thus maintained a tie with what is loosely known as Nasserism or Arab nationalism, but had friendly words to say for oil. He halted the arbitration proceedings under way against Aramco concerning profits on oil transported via Tapline, asking that the dispute be settled in a friendly way. One of his most potent moves was an edict of May 11, 1958 (Royal Decree 380, translation of which is on file at the New York offices of *World Petroleum Report*) regulating the Council of Ministers and laying down that these may not hold other government offices, may not use their positions for commercial activities, nor participate in private business. All government revenues must now go through the general treasury; funds may not be paid out except according to budget authorization; and commitments can only be made by the Council of Ministers. If this is enforced, budget estimates may acquire a reality which they lacked while funds were only loosely controlled or not called to account.

Governmental Attitude: Sheikh Abdullah Tariki, Director General, Petroleum and Mineral Affairs, submitted in 1958 the following statement to *World Petroleum Report* regarding oil policy:

"This government will grant freely, in accordance with the forthcoming petroleum law, new petroleum concessions to any private enterprise of a friendly country which enterprise is reputable, sufficiently experienced, and is financially responsible for the task it proposes to assume, and which approaches this government through the established organizational channels. Under the new petroleum law, concessions will be granted only after public bids have been made and considered."

Questioned directly during a recent press conference, the director general of petroleum and mineral affairs, said further that, in future, the Saudi government will not accept any offers granting it less than 60% of profits; that the 60-40 division of profits should apply to all phases of the integrated operation; that the percentage of crude refined locally should be no less than 30% of total production of the concessionaire company; that the Saudi government will claim the right to supervise production and marketing operations.

END

SYRIA

PHYSICAL DEVELOPMENT

EXPLORATION: The Menhall* exploration permits were cancelled during 1958. The government later announced that drilling on the concession was being resumed, presumably under the government's supervision.

Part-interest in the concession is held by The Atlantic Refining Co., and the company announced it would "rigorously protect its interest." Whether the concessions were literally expropriated or not would fill volumes, but it is the first such treatment of an American company under the new United Arab Republic, and is being closely watched.

Syria is now part of the United Arab Republic, and a plan for coordinated development of oil has been announced. Of a total planned expenditure of $206 million, about $76 million will be spent in Syria. It will include (1) a 360-mile crude pipeline from the Karatchok field (discovered by Menhall), cost estimated at 99 million Syrian pounds, to a Mediterranean terminal, at either Lattakia or Tartous; (2) a small refinery at Kamishlie, near Karatchok, to serve Jezira province; (3) a products line from the government refinery the Czechs are building at Homs to the northern industrial center at Aleppo, via Hama; (4) a products line south from Homs to Damascus; (5) tank farms in the main distribution centers of Syria.

The Menhall difficulties have so far not affected operations of Deutsche Erdoel (Concordia) which is continuing actively with its fourth wildcat (see map). All have had oil shows. The company is using three drilling rigs, with two seismic and one geological crew. Wells drilled are as follows: *El Bouab 1:* final depth 3,501.8 meters, bottomed in Permian; *El Bouab 2*—1.2 km north of El Bouab 1: final depth 1,732 meters, bottomed in Middle Cretaceous. In these two wells, several oil and gas shows were tested but did not result in any commercial oil production.

Concordia reports drilling depths for its three rigs now operating in Syria: *Cheikh Sollakh 1* at 3,266.9 meters as of mid-January 1959; *Kamichlie 1* at 1,364.5 meters as of same date —objective 2,300 to 2,500 meters; *El Barde*, spudded November 25, 1958, at 1,724 meters as of mid-January.

The government of Syria announced, in November 1958, that considerable amounts would be spent on exploration under the new oil investment plan, plus some investment in facilities at the Karatchok field.

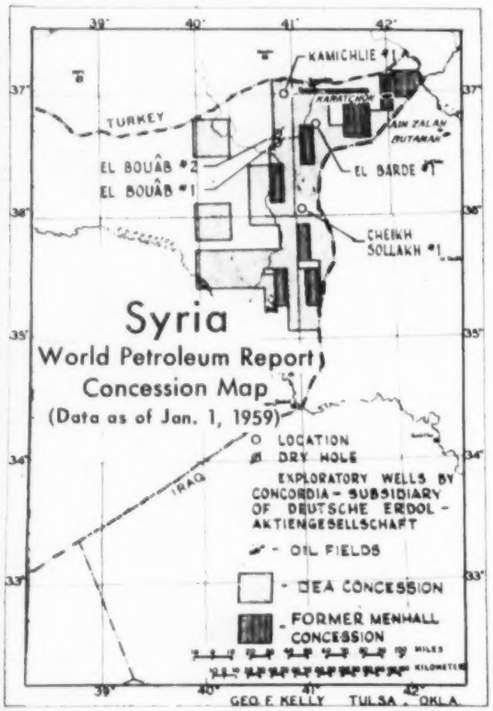
According to the president of the executive council for the Syrian region, an organization for exploration in Karatchok field will be completed shortly. Repayment to shareholders of the dissolved Menhall Oil Co. is still being studied. The government has assured UAR stockholders of early receipt of their rights.

Government estimate of Karatchok reserves is 150 million tons (about 1.1 billion barrels).

A government spokesman announced, in December 1958, that a branch of the UAR General Authority would be established in Syria to explore for oil in all parts except those belonging to the German firm Concordia. It will also take over operations of James Menhall, USA oil man whose company was expropriated recently.

An agreement has been made (see *World Petroleum Report—1958*, p. 167, for details) for Russian oil aid. It had been reported in the press that several turbodrills had arrived, but such reports proved unfounded. The agreement is a concordat, more a declaration of intention than an actual operating arrangement. However, some Soviet oil experts appeared briefly to look the situation over.

* See *World Petroleum Report—1957* for a brief review of Menhall's work and previous exploration by Iraq Petroleum Co. See *WPR—1958* for review of later developments, including the Russian and German activities.



REFINING: There are no refineries in Syria at present, but the government is now working on reconstruction of a Czechoslovakian plant with the help of Czechoslovakian technicians. The plant's location is at Homs. Completion of a 20,000 b d skimming plant is scheduled for July 1959.

Five Syrians went to Czechoslovakia during 1958 and returned after a training period there. They are to work at the Homs refinery. The government has reportedly expropriated land for a nitrogen-fertilizer and an ammonia plant near the refinery.

TRANSPORTATION: Syria is crossed by two of the world's great pipelines: the Iraq Petroleum Co.'s lines; and Tapline, the only pipeline outlet to the Mediterranean for Saudi Arab crude. Size and capacity of these pipelines is discussed under Iraq and Saudi Arabia sections, respectively.

For some years, continuing negotiations have been going on concerning the royalties to be paid by Tapline and IPC. IPC has reached an agreement with the government based on a ton-mile formula, but Tapline's payments are still under negotiation. Some years ago, Tapline agreed to the 50-50 division of profits, based on the difference in selling price between Ras Tanura, the marine terminal in Saudi Arabia where oil from Saudi Arabia is shipped if not taken by pipeline to the Mediterranean, and Sidon, where crude transported by Tapline is picked up at the Mediterranean. How to split these profits between the four countries involved was left to the countries themselves to decide. They have not as yet been able to do so. Negotiations now are taking place between Syria and Tapline wherein the government takes the view that transportation costs should not be determined by the company, but by specialized international agencies independent of either party.

Throughput by IPC during 1957 was reported at 27 million tons (about 540,000 b/d), and payments by IPC were about Syrian 6.5 million pounds.

Negotiations had been close to conclusion when interrupted abruptly in May 1958 by the crisis in Lebanon. At that time, agreement had been reached on the basis for calculating and splitting Tapline's proposed 50% profit pool among Syria, Jordan, and Lebanon, after deducting a 63% share for Saudi Arabia (based on Tapline mileage within that country).

SYRIA — Imports, 1957

(Thousands of Barrels)

Gasoline	814
Kerosine	547
Gas oil	2,046
Diesel oil	7
Fuel oil	1,009
Lubricating oil	79
Other	6
Total	4,508

Source: Summary of Foreign Trade, Damascus, through the US Department of State.

SYRIAN SETTLEMENT WITH IPC

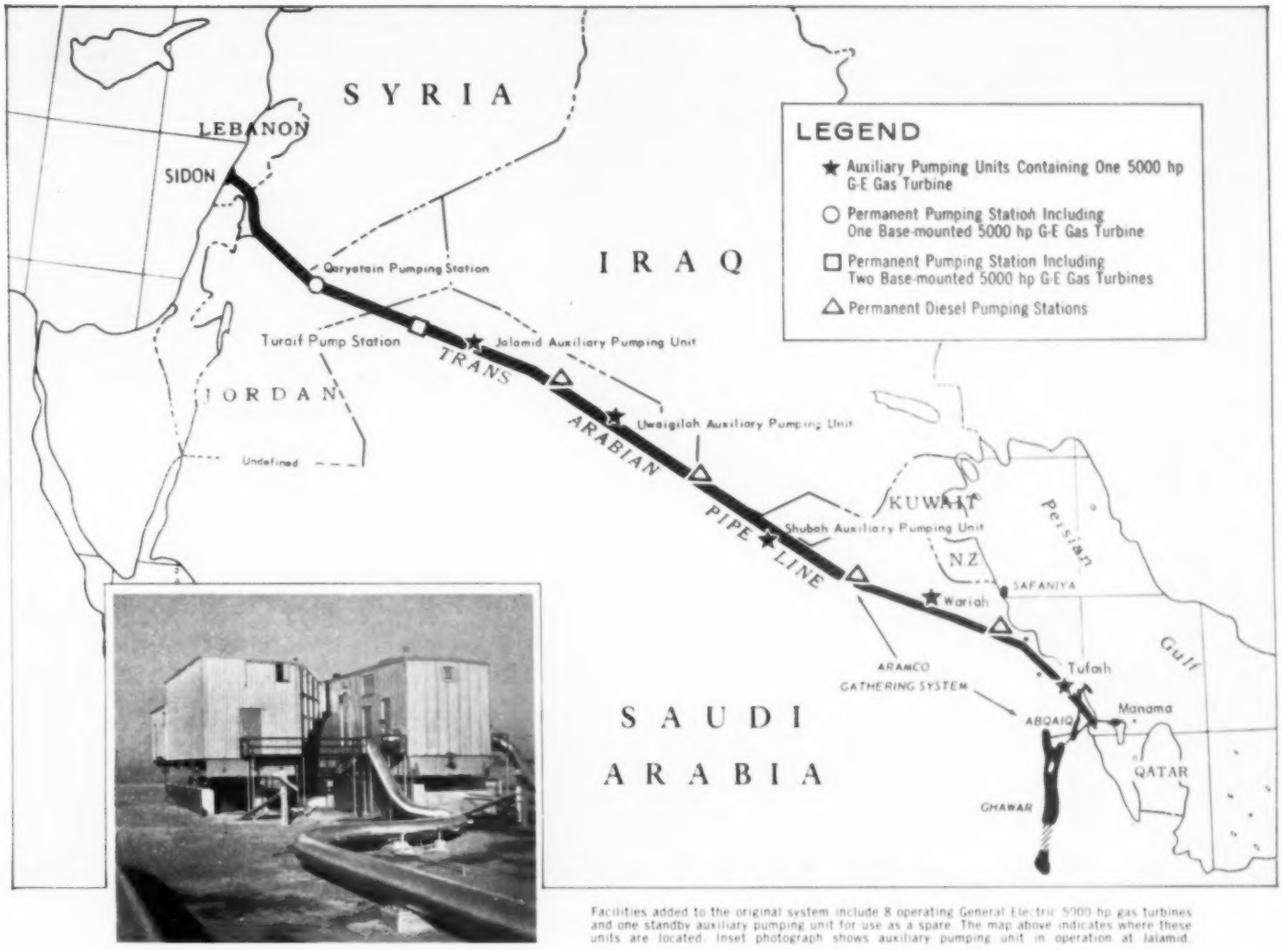
Iraq Petroleum Co. has announced it has reached agreement with the Syrian government on the revision of payments under its 1931 convention in respect of the company's pipeline and terminal operations in Syria. The agreement reached in Damascus, November 26, 1958, will give the Syrian government a revenue of some £16,500,000 sterling (US $18.2 million) on the expected rate of throughput of approximately 26 million tons (about 520,000 b/d) during 1956. The sum of £6,500,000 is made up of payments of 1/4d (one shilling and four pence) per hundred ton-miles for the distance traversed through Syrian territory, and 1/1d (one shilling and one penny) per ton on the terminal throughput. These payments, amounting to £6,000,000, are in fact equivalent to 50% of the calculated profit on the pipeline and terminal operations in Syria. In addition, there are port dues and security payments amounting to £500,000 per annum. The company also agrees to pay Syria the sum of £8,500,000 (US $23.8 million) in settlement of all outstanding claims between the two parties.

OIL LAWS*

Controlling Statutes:* Basic regulation is the old Mining and Quarries Law, Law No. 7 of December 21, 1953; Law No. 61 of 1958; Decision No. 1174/W of May 11, 1957, amending Mines and Quarries Law No. 7 of December 21, 1953; and Decree 294 of January 20, 1954 (fixing conditions and methods of application for permits and concessions).

Part of the country's oil regime covers the concessions which have been granted. The Concordia concession is also kept on file at the offices of *World Petroleum Legislation Report*, designated as "Book of Conditions for Exploration of Liquid and Gaseous Hydrocarbons and Their Byproducts—for The United Petroleum Co. (Concordia) Ltd." END

* Copies and translations of these laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y. (see p. 22 herein).



Facilities added to the original system include 8 operating General Electric 5000 hp gas turbines and one standby auxiliary pumping unit for use as a spare. The map above indicates where these units are located. Inset photograph shows auxiliary pumping unit in operation at Jalamid.

How General Electric helps increase pipe line capacity 40% on the 1000 mile Trans-Arabian pipe line system

Installed cost of unattended G-E gas turbine units only one-sixth the investment of conventional community-type stations

It takes plenty of power to pump petroleum through the 1000 mile Tapline and Aramco pipe line system. To gain even greater capacity from the existing pipe line system, Trans-Arabian Pipe Line Company and Arabian American Oil Company turned to General Electric.

For optimum economy they decided to install specially designed auxiliary pumping units that would be both remotely controlled and portable. Adhering to Tapline specifications, General Electric undertook to build these units. The entire system was planned to include six portable simple-cycle G-E combustion gas turbines and 3 permanent base-mounted gas turbines each rated at 5000 hp. The gas turbines of the auxiliary pumping units were housed in portable vans. They were designed to be operated on an unattended basis and are radio-controlled by operating personnel at the main pumping stations 50 to 100 miles away.

When the initial portable unit went into operation, it marked the first time a turbine of this size was ever controlled remotely for continuous operation. This was also the first time a gas turbine had been fueled with crude oil taken directly from the pipe line.

When all installations are completed, total capacity of the pipe line will have been raised from 320,000 barrels of oil per day to 450,000—an increase of over 40%—providing maximum pumping power at minimum cost. For further information on how G.E. can help you with your power needs, consult your nearest G-E representative or write: *International General Electric Company, 150 East 42nd Street, Dept. 59-37, New York 17, N.Y., U.S.A.*

GENERAL ELECTRIC
—U.S.A.—

TRUCIAL COAST

Interest has risen sharply in this area since the offshore discovery of oil near Das Island. It showed that the Lower Cretaceous extends much farther south than formerly believed, and changed the complexion of the entire lower Persian Gulf oil search—being the only island east of the Qatar axis with indications of commercial oil.

Das Island—Abu Dhabi Marine Areas Ltd., owned two-thirds by British Petroleum Co. Ltd. and one-third by Cie. Française des Pétroles, obtained its 1,200-square-mile concession from the Sheikhdom of Abu Dhabi in 1953, covering all offshore waters.

The initial test was No. 1 Adma, now No. 1 Umm Shaif, drilled from an offshore platform, to a total depth of 8,755 ft. Tests completed of the Jurassic Arab Zone limestones produced only gas, but the Lower Cretaceous Shuaiba limestone flowed oil for a limited period at about 2,400 b/d. Oil is of 40 deg API gravity, with a sulfur content of about 1.4%.

The Jurassic, which in Umm Shaif had gas shows, is the source of most Saudi Arabian production, including Ghawar and Abqaiq fields. Production possibilities were indicated in Umm Shaif No. 1 in the Thamama (also known as the Yamama), the Arab Zone, and the Darb (the last has never before been productive in the Middle East). Production in Aramco's recent Manifa discovery (see Saudi Arabia section) is from the Thamama, and was then the first time the formation had been found productive in the Middle East.

An appraisal well, No. 2 Umm Shaif, was spudded about December 15, 1958, and is being drilled about two miles west of No. 1 Umm Shaif. Depth was 3,500 ft at January 15, 1958.

Onshore: Iraq Petroleum Co. is the sole operator in this territory. Onshore, seven wildcat wells have been drilled—all of them very expensive and all dry, with the exception of Murban No. 1.

There are a number of large anticilines in this area; but all wells, such as Fahud—which tested one of them—have been dry. Oil shows were found almost continuously in Fahud, according to unconfirmed reports, but the sands were so tight the oil could not flow.

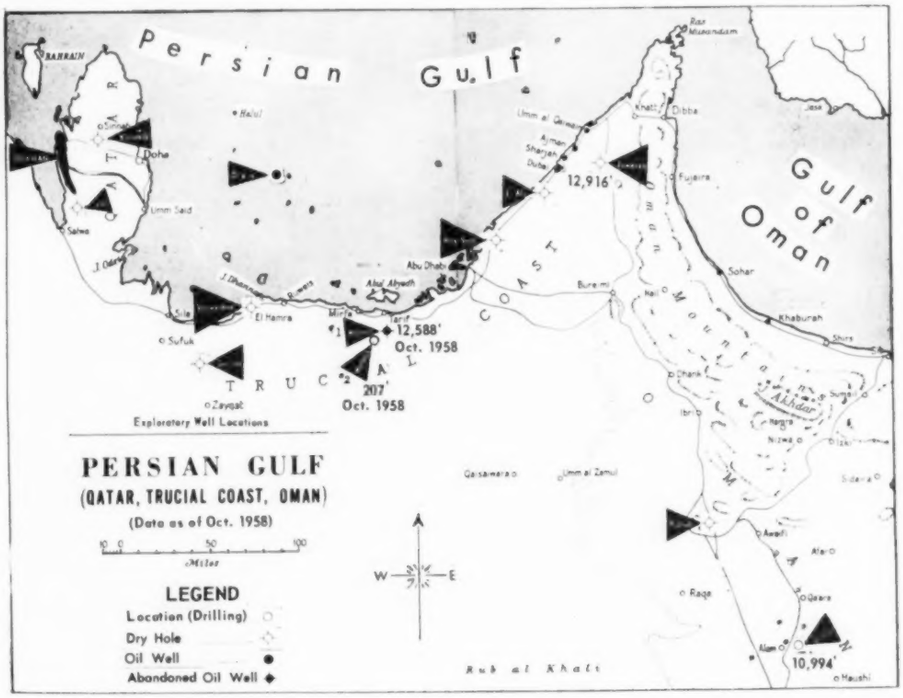
In May 1958, two seismic parties were operating for Petroleum Development (Oman) Ltd. In the Fuqait area, Petroleum Concessions Ltd. (both companies are subsidiaries of IPC) had a double-gravity and magnetic party operating.

NATIONAL FACTORS

There are seven principal sheikdoms in the Trucial Coast: Abu Dhabi, Dubai, Sharjah and Kalba, Ajman, Umm al Qaiwain, Ras al Khaimah, and Fujairah. Income is derived principally from customs duties and oil-concession payments.

TRUCIAL COAST AND OMAN — Drilling Operations
Exploration Wells Completed or Drilling, 1958

Location	State	Bottomed (Date)	Depth Reached (feet)
Ras Sadr	Abu Dhabi	April 1951	13,001 Abandoned
Jebel Ali	Dubai	July 1952	12,353 Abandoned
Murban No. 1	Abu Dhabi	October 1954	12,588 Abandoned
Gezira	Abu Dhabi	March 1956	12,500 Abandoned
Fahud	Oman	May 1957	12,235 Abandoned
Shuweihat	Abu Dhabi	November 1957	12,360 Abandoned
Juweiza	Sharjah	Spudded Aug. 1957	12,916 Abandoned
Ghaba	Oman	Spudded Mar. 1958	12,275 (Jan. 1, 1959) (gas show)
Murban No. 2	Abu Dhabi	Spudded July 1958	2,600 (end Nov. 1958) (in Eocene)



TURKEY

PHYSICAL DEVELOPMENT

EXPLORATION: Until 1954 oil was a monopoly of the government. However, since that time, a new oil law has brought activity to a high peak, and recent discoveries may indicate an extension of the Middle East's oil riches to this area.

An estimated total of Turkish lire 70 million ($US 24.5 million) was spent on crude-oil prospecting in Turkey during 1958, equal to the total amount spent on oil prospecting in all years through 1957. About 12 drilling rigs were active in 1958, compared with nine in 1957.

There follows a review of exploration activities, by company:

American Overseas Petroleum Ltd. (AMOSEAS): The first well, Aril No. 1, twelve miles east of Gaziantep in southeast Turkey, was spudded in November 1956, and abandoned in August 1957 at 10,153 ft. The second well, Kahta No. 1, was located 60 miles northeast and drilled to a total depth of 6,365 ft. It is being tested on pump, and has produced some heavy oil of 10 to 11 API gravity. Kahta No. 2 was drilled half a mile south, to a total depth of 3,647 ft, and is testing. A new location, Kahta No. 3, was made 1¾ miles west of No. 1. Press reports indicate Kahta No. 1 will produce steadily at about 249 b/d; but there can be considerable variation higher and lower, depending on the pumps used.

Surface geological mapping has been carried out during each field season (May to November) since 1953, and four field parties are at present working in the three petroleum districts where licenses are held. A reflection seismic party made a survey of the licenses in Thrace (District I) from June 1956 to September 1958.

Turkish Petroleum Corp.: This company is over 51% owned by the Turkish government. It has 21 licenses and is extremely active, with five rigs operating. It also does all Turkish producing and refining at present. Its activities in those fields are covered under the appropriate sections of this report. One oil discovery was made in 1958 (see table).

Turkish Petroleum Corp. (TPAO) evidently has found a new field at Germik. It is very near the Garzan field. However, it is believed to be a related but separate structure. Drilling in 1959 will further define the field. TPAO is drilling a deep test in the Kentalan area, where the first well was abandoned due to mechanical difficulties in October 1957 and where the present

(Continued)

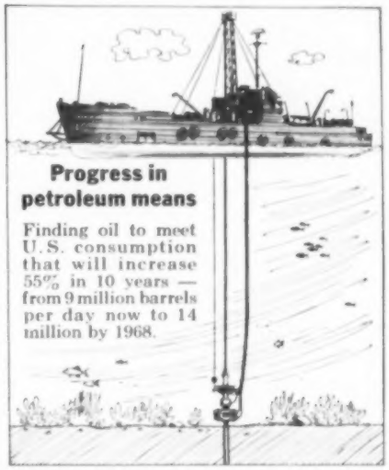
Navy landing ship converted by Standard for off-shore oil search. A 55-foot drilling mast is poised over circular 10-foot-wide opening from deck through bottom.

"Live" TV show 40 fathoms down guides our search for future oil reserves

With new oil becoming harder to find, our search widens. Now we're exploring the ocean floor — and new techniques are the rule. In one such venture we lowered a TV camera 250 feet below the waves to help guide the drilling of test holes from shipboard.

This is typical of the novel techniques used in our quest that last year took us to 21 states, Canada, Alaska and ten Latin American and Caribbean countries. In all, we drilled 120 exploratory wells. Although the cost ran to many millions, the successful ones helped us locate more new oil than we withdrew from the ground.

Actually, this benefits you as well as Standard. It means an adequate reserve of our most valuable national resource, to be drawn on in days ahead to provide the thousands of products from petroleum so essential for your daily needs.



Progress in petroleum means

Finding oil to meet U.S. consumption that will increase 55% in 10 years — from 9 million barrels per day now to 14 million by 1968.

STANDARD OIL COMPANY OF CALIFORNIA *plans ahead to serve you better*

TURKEY ***(continued)***

well was begun in January 1958. It was at 2,062 meters late in 1958. Kiradag No. 1 well was drilled by TPC in May 1958, about 8.5 kilometers from the Batman refinery. No oil was encountered; T.D. 2,008.5 meters (6,588 ft).

Standard Oil Co. (New Jersey): Through its subsidiary, Esso Standard (Turkey) Inc., this company carried out 35 party-months of geological and 41 party-months of geophysical work during 1957, and continued at about the same level during 1958. It has drilled three exploratory wells in District I (Thrace, European Turkey), two of which—Ceylan No. 1 and Osmancik No. 1—were completed in 1957; and the third—Karapurcek No. 1— was abandoned, April 24, 1958.

Ceylan No. 1 was begun, April 5, 1957, and completed, June 4, 1957, at a total depth of 4,364 ft as a dry hole. The drill penetrated Miocene, Oligocene, and Eocene sediments and reached preTertiary metamorphics.

Osmancik No. 1, the second test in the same district, was begun, June 22, 1957, and completed, October 12, 1957, at a total depth of 10,839 ft in the Eocene. An oil show of noncommercial importance was encountered.

Karapurcek No. 1, Esso's third test in Thrace, was started, November 6, 1957, and abandoned, April 24, 1958, at a total depth of 10,839 ft in Eocene.

The rig was moved to southeastern Turkey, where Gereüs No. 1 was drilled and abandoned. Another well was drilled later—also abandoned.

Bolsa Chica: The first well by Bolsa Chica Oil Corp. was No. 1 Zengilan, abandoned with no significant shows during late 1958 at 6,445 ft. The second test, No. 1 Hazro, was temporarily suspended at 4,050 ft due to winter weather during January 1959. Location for a third test, No. 1 Silvan, has been staked out (see map).

The company will drill four tests in Zone V. No drilling is planned immediately for the licenses in the Bay of Iskenderun area. Bolsa Chica owns one-third interest in the entire project, pays one-third of the cost, and acts as operator. Other members of the project include Frank Frankel, of Houston, Texas; and A. J. West, Los Angeles, Calif., independent operators. Contributions against the cost of tests, payable in the event of dry holes, have been committed by the Turkish operating subsidiaries of Royal Dutch-Shell, Standard Oil Co. (New Jersey), and Socony Mobil, holders of contiguous licenses.

Mobil Exploration Mediterranean Inc.: This company spudded its first test well, about 20 miles south of Adana, December 2, 1958.

Mobil's exploration program currently involves two seismic groups and one double gravity group. Three seismic groups were operating in 1958, and the double gravity group was disbanded on completion of its assignment.

Gulf Oil Corp.: Exploration work continued in Turkey in 1958; however, no drilling was done. D. D. Feldman Oil & Gas, of Dallas, Texas, farmed out 75% interest on 13 Turkish exploration licenses to a wholly owned Gulf subsidiary, Turkish Gulf Oil Co., which will be operator for the two companies.

Shell Group: A Royal Dutch-Shell subsidiary spudded its first wildcat in European Turkey during early 1958. The Thrace test, Terzili 1, was 120 miles west-northwest of Istanbul.

Tidewater Oil Co.: This company began drilling in December 1957 on the Bakuk structure in southeastern Turkey. The test, which was abandoned at 12,500 ft in late 1958 without encountering production, is located on one of the exploration licenses granted in 1956 to a three-company group in which Tidewater is the operator. Equal-interest participants in the group are Tidewater Oil Co., The Atlantic Refining Co., and Texaco-Seaboard Inc. Photogeologic work, geophysical surveys, and surface geological work have been in progress on the acreage since the licenses were granted. Immediate plans entail further testing of structures in the vicinity of the initial effort. The Ebyat location, some 28 miles northeast of Bakuk, was spudded in the fall of 1958.

TURKEY — Drilling Activity*

(As of December 1, 1958)

Year	Total	Drilling Ahead	Oil	Gas	Dry	Abandoned Wells	Total Footage
1955							
Exploration wells	2	—	—	—	2	—	10,300
Production wells	10	—	10	—	—	—	45,600
1956							
Exploration wells	—	—	—	—	—	—	—
Production wells	7	—	7	—	—	—	33,700
1957							
Exploration wells	3	—	—	—	2	1	12,600
Production wells	8	—	7	—	1	—	39,500
1958							
Exploration wells	3	1	1	—	1	—	20,000
Production wells	11	3	7	—	—	1	51,000

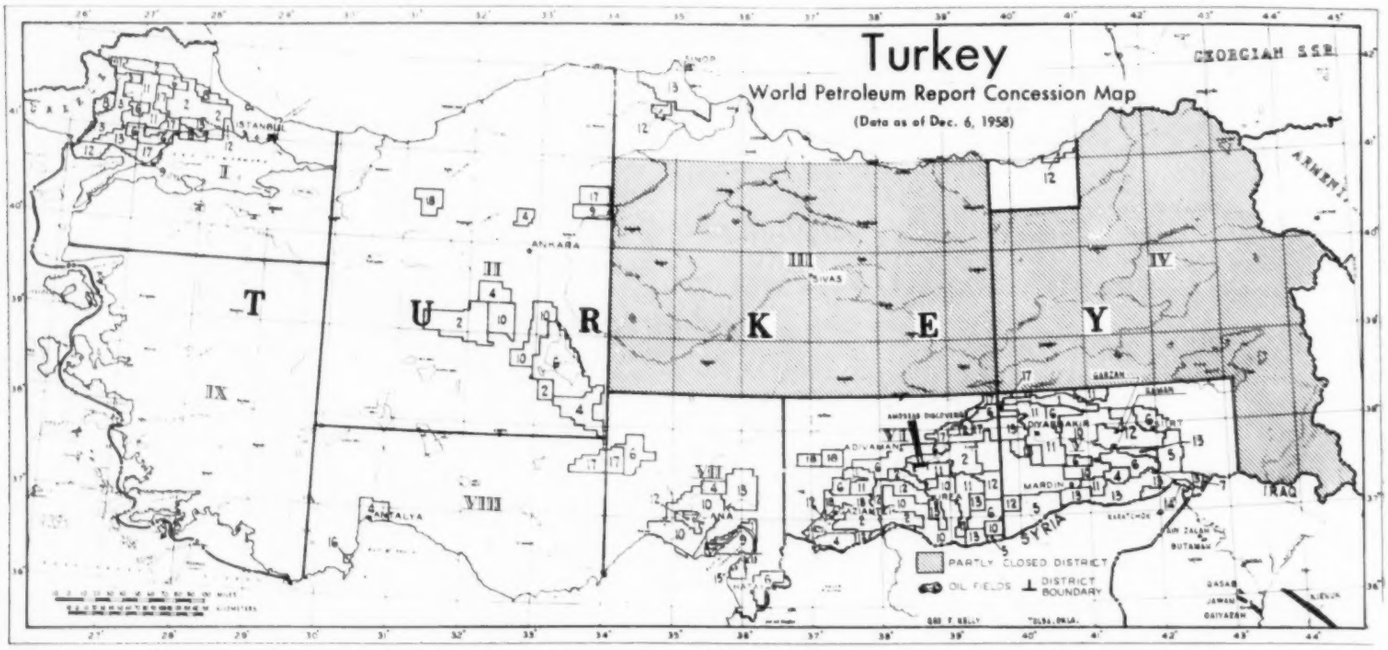
*By Turkish Petroleum Corp.

Pan American Land & Royalty Co.: This Dallas, Texas, independent (no relation to the Pan American subsidiary of Standard of Indiana) obtained eight concessions late in 1958. Work has not yet begun.

Deilmann Petrol Ltd.: This is the Turkish subsidiary of Deilmann Bergbau GmbH, a German producing company. From the beginning of 1958 until the end of August, six party-months of geological investigations (laboratory and field activities, photogeology) were carried out in Turkish Thrace, as well as six party-months of seismic work and eight party-months of magnetometer work. These operations are being continued.

British American Oil Co.: A subsidiary of the USA independent, Gilliland Oil, this company intends to resume drilling Rubai No. 1 at Kale, near Cizre. At 7,462 ft, it was abandoned with some gas shows. Another well may be drilled at

(Continued)



Number	Company	Number	Company	Number	Company	Number	Company
1.	Bolsa Chica Oil Corporation	5.	Deutsche Erdol–AG	10.	Mobil Exploration Mediterranean	14.	Turkish American Oil Co. Cizre
2.	California Asiatic Oil Co. / Texaco Overseas Petroleum	6.	Esso Standard (Turkey) Inc.	11.	N. V. de Bataafsche Pet. Mij.	15.	Turkish American Oil Co. Iskenderun
3.	Deilmann Manton G.m.b.H.	7.	Gillikind Oil Corporation	12.	Turkiye Petrolleri A.O.	16.	Etta Limited Sirkeit
4.	D.D. Feldman Oil & Gas (Turkish Gulf Oil Co.)	8.	Marmara Petroleum Corp.	13.	Tidewater Oil Company / Atlantic Refining Company / Seaboard Oil Company	17.	Turkish Gulf Oil Company
		9.	Istanbul Tabii Gaz Ltd. St.			18.	Pan American Land & Oil Royalty Co.

TURKEY ***(continued)***

Arsus, where a dry hole was drilled in 1956. Operations there were discontinued due to difficulties at 5,500 ft. A dry wildcat (Arsus) at Iskenderun, was directionally drilled to 8,869 ft during 1956. No oil shows were reported. Gilliland's latest well was abandoned dry.

A German concern, *Deutsche Erdoel*, is planning to start drilling soon.

Marmara Petroleum Corp., a subsidiary of the American-owned Husky Oil (which has an Israeli subsidiary), is still at the stage of geophysical survey.

The Istanbul Natural Gas Co., in which the Californian firm of Ralph M. Parsons, builders of the Batman refinery, has a majority interest, is chiefly interested in natural-gas reserves at Murefte on the southern Thracian coast of the Sea of Marmara. However, it also has concessions in other parts of Turkey.

PRODUCTION: Turkish Petroleum Corp. is the only producing company in Turkey. Production is from its Garzan and Raman fields.

Raman is a 4,000 b/d oil field discovered in 1944. The oil-producing horizon is a dolomitic limestone of the upper Cretaceous, lying at a depth of 4,000 ft. Garzan is a 2,000 b/d oil field discovered in 1951. Oil is produced from the same horizon as at Raman.

There were 14 producing wells at Raman as of December 1, 1958, and 16 at Garzan. Crude is 20.5 and 26.5 API gravity, respectively.

Reserves: The Turkish government estimates reserves in the Garzan field at over seven million tons (about 52.5 million barrels). Raman reserves are not known.

Oil's importance to Turkey: Oil supplies about 17% of Turkey's total energy, and accounts for about one-thousandth part of the country's total revenues.

TURKEY — Crude-Oil Production, 1958

(Barrels Per Day)

January	5,149	July	6,451
February	5,003	August	6,071
March	6,180	September	6,410
April	6,216	October	6,500*
May	6,574	November	6,563
June	6,348	December	6,590

Year (1958) 6,164 b/d (partly estimated).

*Estimated. Source: Turkish Petroleum Corp.

REFINING: Turkish Petroleum Corp. has a 330,000-ton (6,600 b/d) refinery and a 27,000-ton-per-annum (560 b/d) pilot refinery at Batman. Some $5 million in orders have been placed for equipment to increase annual production and refinery facilities to over 600,000 tons (about 12,000 b/d).

Batman refinery production in 1957 included 550,184 bbl of gasoline, 117,785 bbl of diesel oil, 1,011,671 bbl of fuel oil, and 226,406 bbl of asphalts.

Atas Co., owned by a group of four companies, plans to open a 65,000 b/d refinery at Mersin in 1962. Firms holding an agreement on the project with the government are Royal Dutch-Shell, Caltex, British Petroleum, and Socony Mobil. Atas Co. has selected Mersin in Icel province, southern Turkey, for the $48 million refinery site.

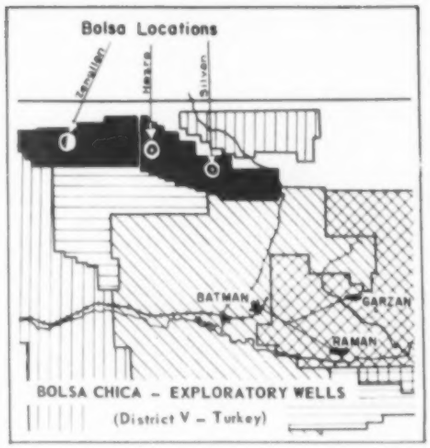
A 15,000 b/d refinery by Turkish American, an independent company, at Istanbul, has been authorized by the government.

TRANSPORTATION: There are no major oil pipelines other than the facilities linking Garzan and Raman fields to the Batman refineries: two 6-in. pipelines, respectively 22.5 km and 25.3 km in length.

Two products lines have been completed: One goes from Antalaya to Eskisehir; and a 200-mile 4-in. line goes from Eskisehir to Bandirma. A 450-mile 8-, 6-, 4-in. products line for NATO, from Iskenderun to Batman, was recently completed.

Iran-Turkey Pipeline Agreement: An Iranian-Turkish agreement of intent was signed in 1958. It calls for construction of a 930-mile crude pipeline from the Qum field of Iran to Iskenderun, a Turkish port. Capacity would be 500,000 b/d. Cost was estimated at about $500 million. Duration of the agreement is 80 years. Profits would be divided on a 50-50 basis after a five-year period during which Iran, which would construct the line, would amortize its cost. Until such period, Turkey would receive 23% of profits. Turkey would be allowed a 6% discount on crude purchases up to 10% of throughput. The terms of this agreement conform to the 1957 Turkish Law No. 6987, regarding pipelines which might cross Turkey and enable refineries to use their crude.

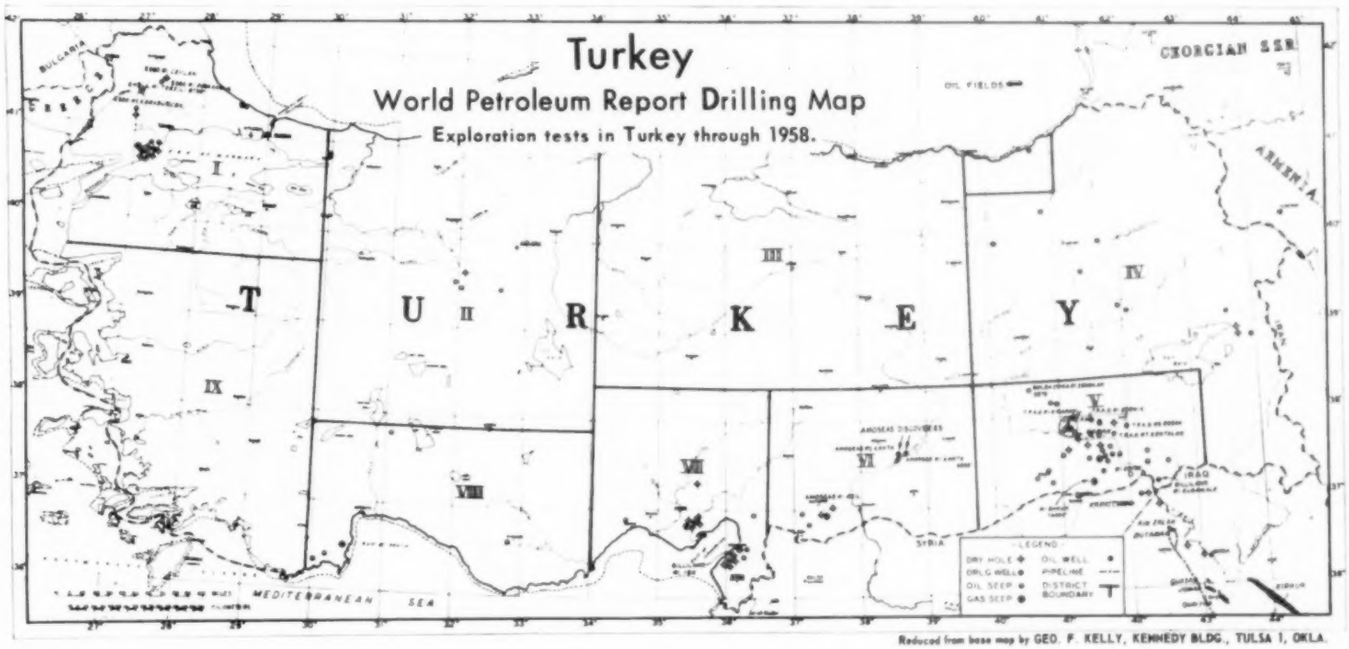
There appear to be substantial difficulties in implementing this agreement. A similar project was considered during 1957 and early 1958 by the international oil companies. It was decided that not only would it antagonize Iran's Arab neighbors, but tankers—especially the large new supertankers—are much more flexible and less vulnerable than such a huge line. In any case, there is no producing well at Qum as yet, only the discovery well which ran wild at over 100,000 b/d.



MARKETING: Turkey's oil needs are advancing rapidly with the country's industrialization. Estimated consumption increase in 1957 was 13%, and nearly the same increase was registered in 1958. Suppliers include Socony Mobil, Shell, British Petroleum, and Caltex. The latter's supplies go to Petrol Ofisi, the government-owned importing and distributing agency which now has about one-third of the market. Since about four-fifths of oil needs are imported as finished products, the completion of the new refineries planned will save considerable foreign exchange.

Internal retail prices have been frozen by the government. During 1958, they were increased by 40% to 50%, but continue to lag behind the general inflationary increase.

(Continued)



Reduced from base map by GEO. P. KELLY, KENNEDY BLDG., TULSA 1, OKLA.

TURKEY ***(continued)***

OIL LAWS*

Controlling Statutes* include: Petroleum Law of the Republic of Turkey—Law 6326 of March 16, 1954, as amended by Law 6558 of May 13, 1955; Regulations for Administration of the Petroleum Law of the Republic of Turkey, Law 6987 of June 1, 1957 (amending Petroleum Law 6326 and Law 6558).

No important changes were made in Turkey's petroleum laws during 1958. For a résumé of the laws' provisions, see *World Petroleum Report—1957*, p. 250, 252, and 253.

* Copies and official translation of these laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

The principal considerations affecting investment are discussed in detail in *World Petroleum Report—1957*, p. 254. Briefly, they include: (1) no exchange control for oil earnings; (2) peaceful labor situation; (3) low income taxation, consisting of a 10% corporation tax, plus a 15% withholding tax on the remaining 90% of profits, for a total 13.5% tax; (4) no change in the government's liberal attitude toward international investment.

The government has pushed an intensive program of economic development and, lacking foreign-exchange resources, the country is chronically short of foreign exchange. Inflation was about 15% during 1957, and there are big arrears of commercial debts, with indebtedness within the European Payments Union over $450 million at last reports. The oil backlog alone is $40 million. Discovery of oil would do much to relieve the foreign-exchange situation. During the Suez crisis, the cost of oil imports rose to about 149 million Turkish lire, or $52 million (the lira is valued at about 35 US cents).

END

YEMEN

PHYSICAL DEVELOPMENT

During 1958, the concession held by Yemen Development Corp. was cancelled. The company let it go when no interested party could be found to finance exploration and meet concession dead-rent payments. The German firm C. Deilmann Bergbau GmbH retains its concession, according to the company, but has temporarily suspended work; it stated the government did not observe certain contractual rights of the company. The contractural rights referred to are thought to be the concession area, which may have been overlapped by Yemen Development's area.

Yemen has become part of the United Arab Republic, and subject to increasing communist influence. Several press reports came out in 1958 that oil discoveries had been made in the neighborhood of Hodeida by a Czech mission looking for water. They were not confirmed.

Romanian aid may be coming into the country under a pact signed in December 1956, which has not as yet been implemented. It provides for petroleum products to be sent Yemen, and Romanian personnel to search for oil. Duration is five years, with automatic renewal for five years more if the pact is not cancelled. As Yemen is now part of the UAR, the pact must apparently receive Cairo's approval. It has apparently never been implemented.

It was reported in 1958 that the Italians had offered to explore under an arrangement similar to that in Iran, under which 75% of profits would accrue to the government. No pact was concluded, so far as is known. A similar pact was reportedly discussed with Japanese interests, but no action has resulted from that either.

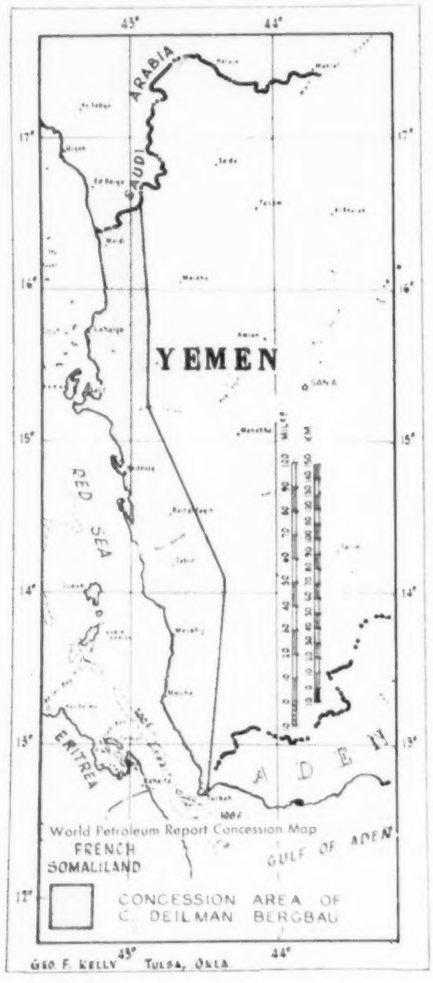
NATIONAL FACTORS

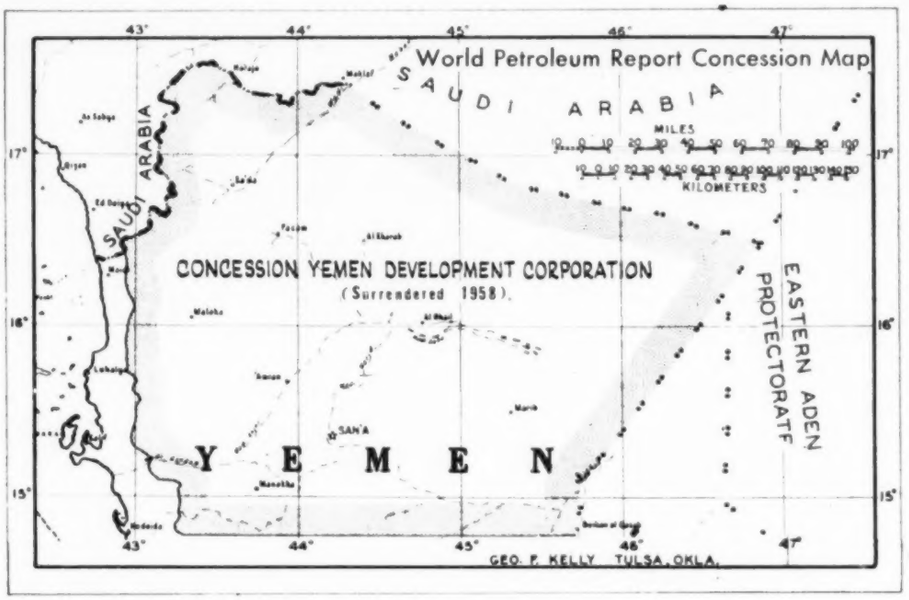
There is no oil law, and all concessions granted are by the Ruler, Imam Ahmad Ibn Yakya Hamid al-Bin. He is ill with many diseases, often incoherent and drug-ridden, according to reports, and has designated Muhammed al-Badr his heir and crown prince. The latter may succeed him without trouble, but a power struggle may ensue.

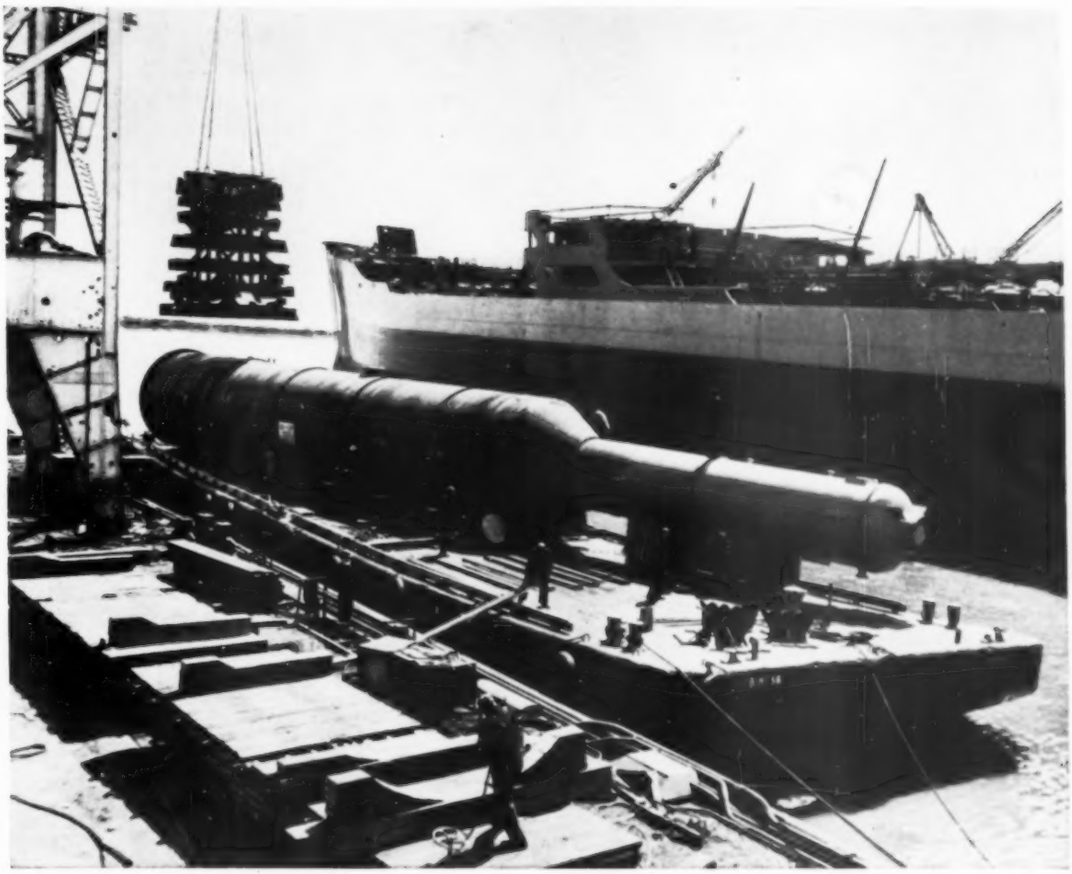
There is little doubt the influence of the communists is steadily growing. There are already somewhere between 150 and 200 "technicians" in the country, although they are closely watched by the old Imam.

The recent defeat of Imam forces by the British in the Dhala frontier slowed down the Yemeni forays against the border; but, while large-scale operations using the Soviet tanks now lying in the sand near Salif port are unlikely, small frontier assaults and similar raids will undoubtedly continue.

END







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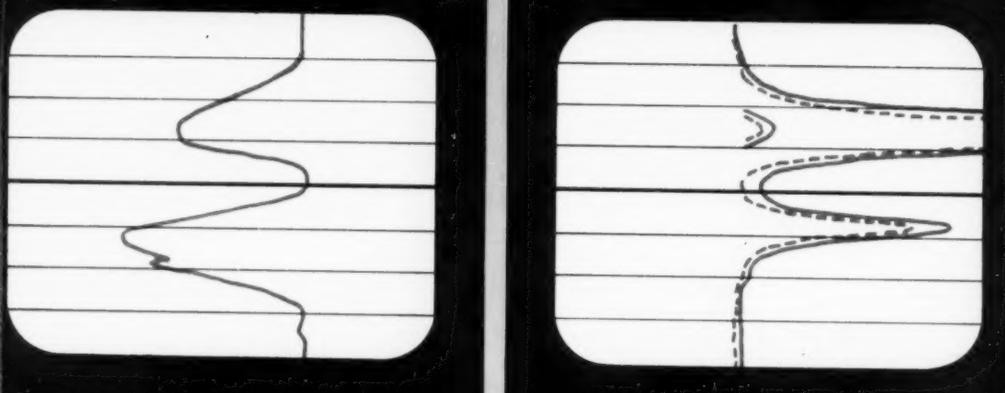


SCHLUMBERGER

EUROPE

This section reviews European developments as a whole. For detailed national information, see appropriate country sections.

No activity is reported and no reviews are contained in this issue for: Andorra, Finland, Gibraltar, Gozo, Iceland, Lichtenstein, Luxembourg, Monaco, San Marino.

PHYSICAL DEVELOPMENT

EXPLORATION: The major news in recent months was discovery of oil in the Paris basin of France. However, Europe's rising oil consumption has made increased domestic production essential, and the OEEC (Organization for European Economic Cooperation) published a detailed study* on Europe's need for more intensive exploration. It classified about 23.3% of Europe's area as sedimentary basin with "rather favorable" oil potential, and 14.3% as "favorable"—of which large areas are completely unexplored.

PRODUCTION: European non communist crude production during 1958 showed an increase over 1957 levels. Oil production in most European countries is trending upward, except in Austria. About 75% of natural gas has been supplied by Italy, followed by Austria, France, West Germany, and The Netherlands—in that order. However, with the development of gas at Lacq in France, this is likely to change. Proved gas reserves at Lacq are about 250,000 million cubic meters, or twice as high as gas reserves in Italy (130,000 million cubic meters). Together with some 35,000 million cubic meters in Austria, West Germany, and The Netherlands, western Europe's established reserves today are of the order of 400,000 million cubic meters. The region's reserves may grow to about 500,000 million cubic meters by 1960, and to 1,500,000 million cubic meters by 1975. Western Europe's consumption of indigenous natural gas could go up to about 70,000 million cubic meters yearly by 1975 from 6,074 million cubic meters in 1956. In 1957, natural gas covered only about 1% of the total energy requirements of western Europe. Forecasts imply that in 1960 gas will cover 3.5% of rising energy demand, and by 1975 about 10%.

TRANSPORTATION: The principal crude pipeline of western Europe, from Wilhelmshaven to the Ruhr, was finished in 1958 [see Germany (West) section]. The crude-oil imports of Europe are so high that a trans-European pipeline of major capacity was proposed from Rotterdam to Marseilles, but the project was shelved in 1958 (see *WPR—1958*, p. 175).

The Council of Europe approved in 1958 a project to pipe natural gas to Europe and North Africa from the northern Sahara via a pipeline through Algeria, crossing the Mediterranean at Gibraltar and spreading to Spain, France, Belgium, the Ruhr, and Britain. Cost makes this a marginal project, however.

REFINING: Refining capacity of Europe rose sharply during 1958, over 1957. For a breakdown, see appropriate country sections. Since most of Europe's consumption will continue to be imported in the form of crude oil, it is probable that refining capacity will follow very closely the trend of rising consumption.

MARKETING: The important basic aspect of Europe's oil utilization pattern is the rapid growth in the use of oil, as shown in the accompanying table. Despite the continuing oil search, West Europe depends upon imports for about 90% of requirements, with consumption increasing rapidly. As a percentage of total energy demand, oil and natural gas are climbing steadily—though not so intensely as in the USA, where economic and supply factors are quite different. The percentages of oil and natural gas in western Europe in 1955 were 25% and 49%, respectively. This balance is estimated to change by 1960 so that petroleum fuels will represent almost 30% and solid fuels 40%.

WEST EUROPE — Oil and Solid Fuels Consumption
(Millions of Metric Tons of Coal-Equivalent)

	1955		1970	
	Solid Fuels	Petroleum	Solid Fuels	Petroleum
Industry	154	56	159	78
Transport*	41	68	32	101
Household and agriculture	143	41	153	52
Producers consumption	37	27	34	39
	375	192	378	270

*Includes international bunkers.

By 1975, industry estimates place atomic energy at only 7% of western Europe's energy needs—with coal contributing 50% and oil 32%. The largest proportion of consumption must continue to be imported, and this amount is increasing rapidly, especially since the energy deficit by 1975 will be 450 million tons of coal-equivalent, or 34% of current consumption.

OIL LAWS

Controlling Statutes: The OEEC report mentioned earlier contains citations of the principal controlling statutes of Europe for oil. Most of these have been translated, and are kept on file at the New York offices of *World Petroleum Legislation Report* (see p. 22, this issue).

The principal oil legislation event in recent months was the passage in December 1958 of the new law governing Spain and the Spanish Sahara. It is part of a general liberalization of Europe's oil laws to facilitate the area's development by international capital to meet the extremely large energy deficit and avoid the cost of imports of Europe's oil, at least in part.

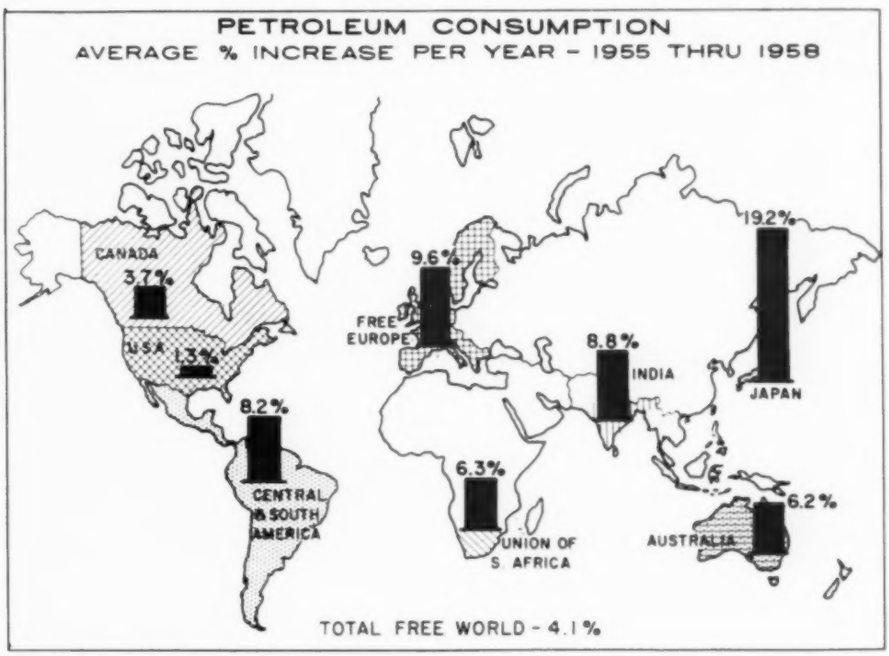
NATIONAL FACTORS

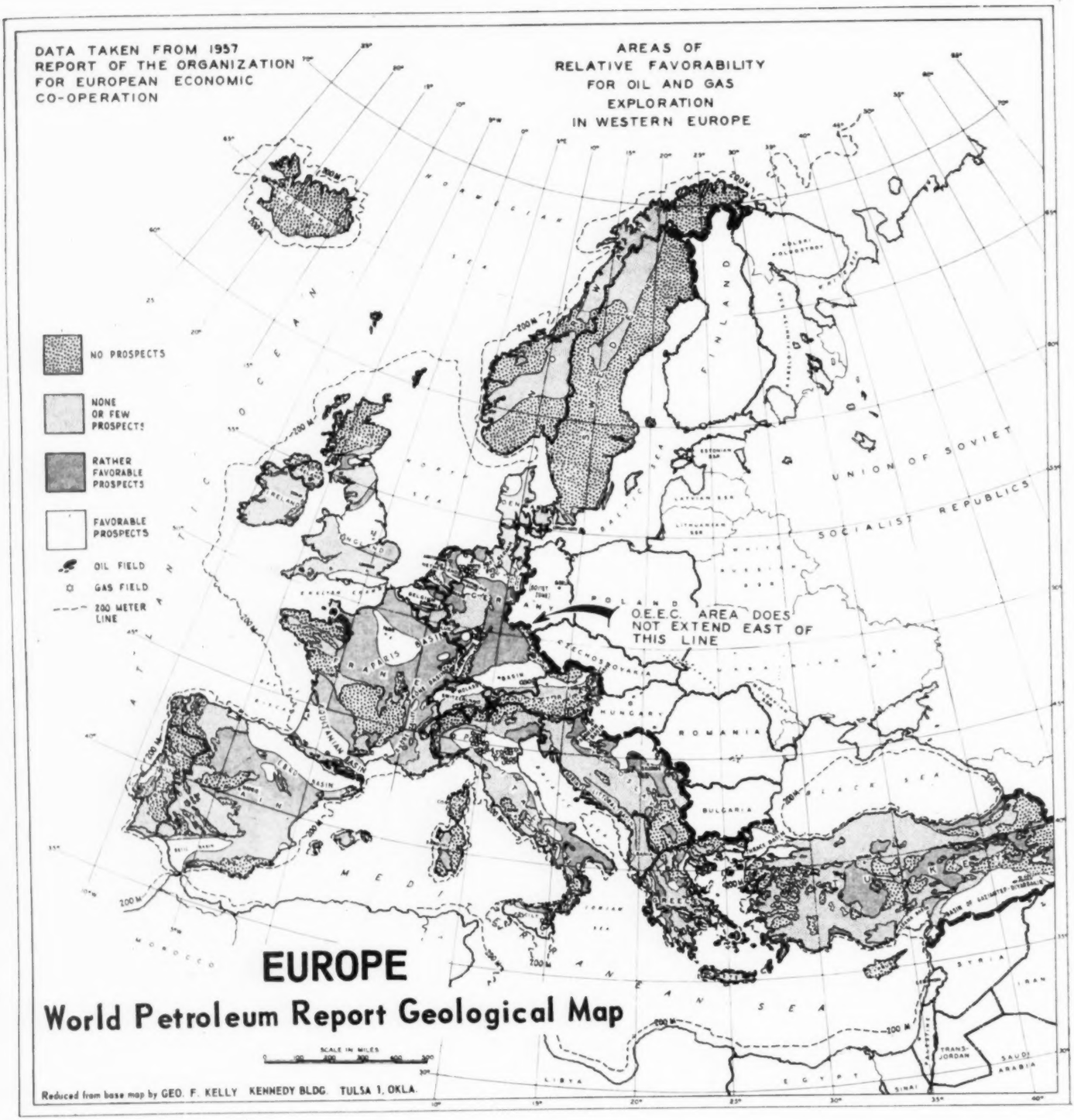
With a generally favorable governmental attitude toward a free-trade area, the most significant recent development was the formation, January 1, 1959, of a common market between France, Germany (West), Italy, and the three Benelux countries. Its effect on oil is not expected to be immediate; it may result in some mergers and some factories of greater size. The elimination of tariff walls between these countries, with a uniform tariff wall around the common-market community, may tend to increase use of oil products pipelines between countries, and location of refineries on purely economic rather than national grounds.

Another important recent development was the return to partial currency convertibility in a number of European countries. The relaxation is a reflection of the internal strength of individual European economies.

(*Continued*)

*The study is entitled "The Search for and Exploitation of Crude Oil and Natural Gas in the OEEC Area." It reviews geology, and is accompanied by a series of useful geological maps. Legislation in European countries is covered briefly. The offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y., has translated and keeps on file all the oil laws of the world. The OEEC report may be obtained, with maps, by writing to the Organization for European Economic Cooperation, 2 Rue Andre-Pascal, Paris 16, France, or 1346 Connecticut Ave., Washington, D.C. Price of the complete study is $10.




DATA TAKEN FROM 1957 REPORT OF THE ORGANIZATION FOR EUROPEAN ECONOMIC CO-OPERATION
AREAS OF RELATIVE FAVORABILITY FOR OIL AND GAS EXPLORATION IN WESTERN EUROPE
NO PROSPECTS
NONE OR FEW PROSPECTS
RATHER FAVORABLE PROSPECTS
FAVORABLE PROSPECTS
OIL FIELD
GAS FIELD
200 METER LINE
O.E.E.C. AREA DOES NOT EXTEND EAST OF THIS LINE
UNION OF SOVIET SOCIALIST REPUBLICS
POLAND
HUNGARY
ROMANIA
BULGARIA
SYRIA
IRAN
LIBYA
EGYPT
SINAI
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EUROPE
World Petroleum Report Geological Map
SCALE IN MILES
Reduced from base map by GEO. F. KELLY KENNEDY BLDG. TULSA 1, OKLA.

AUSTRIA

PHYSICAL DEVELOPMENT

EXPLORATION: Oil exploration is an old story to Austria, where oil production has been going on since the early 1930's. Since World War II, however, the oil industry of Austria has been slowed by a rigid pattern of State control, and it seems destined to remain that way for some time.

Since March 21, 1958, the government OeMV's Spannberg No. 11 well has been flowing a paraffin-based light oil from the Helvet at 7,717 ft to 7,733 ft. The well is located three miles north of the Matzen oil field. Production tests in June 1958 made in the 6,347-ft to 6,368-ft intervals at OeMV's Pyrawath No. 3, 6.3 miles northwest of Matzen, yielded a light paraffinic oil. Pyrawath No. 1, drilled in 1957, looked promising, but soon fell off.

Exploration by RAG: Two rigs were employed in RAG's Ried concession in Western Austria, and completed three wildcat wells during 1958. Wegscheid 1 (15 miles north and 29 miles east of Salzburg), which had a total depth of 10,390 ft in Jurassic, was shut down in September due to disappointing production tests. Perwang 1 (15 miles due north of Salzburg) had a total depth of 11,580 ft in possible Lower Triassic or Upper Carboniferous; was dry and abandoned on September 1. It is the deepest test to date in Austria. Steindlberg 1 (23 miles north and 15 miles east of Salzburg) went to a total depth of 9,200 ft in granite basement; was plugged back to 6,300 ft, and completed for about 40 b d—pumping from sandy limestones of the basal Tertiary.

At the end of 1958, one rig was drilling a southeast stepout from the 1956 Puchkirchen 1 discovery; the other rig was drilling the first wildcat test, Uebersbach 1 (29 miles east of Graz), on RAG's Feldbach concession in Styria. One company's seismic reflection crew was employed throughout the year in the Ried concession in Western Austria.

British Petroleum is prospecting through a joint venture with the OeMV, the Austrian State oil administration (see *World Petroleum Report—1958* for details).

PRODUCTION: Crude output has declined steadily in the past several years—from a daily average of 59,242 bbl in 1957 to 52,799 b d in 1958.

The proved exploitable reserves of gas horizons were estimated at approximately 1,059.3 billion cubic feet as of January 1, 1956. Since that date, no essential change in gas reserves has taken place. Natural gas, so far as it comes from pure gas horizons, is concentrated up to 80% in the Zwerndorf natural-gas field.

Four enterprises participate at present in Austria's oil production: the entirely nationalized Oesterreichishe Mineraloelverwaltungs AG (OeMV) (Austrian Mineral Oil Administration Ltd.); the Rohoelgewinnungs AG (RAG) (Petroleum Recovery Ltd.), a private enterprise; the Erdoelproduktions-GmbH (EPG) (Petroleum Production Co.), 50% of the capital of which is State-owned; and R. K. van Sickle, a private firm.

AUSTRIA—Production, 1958

Month	Oil (Metric Tons)	Gas (Thousands of Cubic Meters)
January	257,342	84,085
February	230,402	71,771
March	248,127	75,279
April	235,696	66,207
May	240,361	48,982
June	231,876	48,218
July	237,656	49,625
August	238,001	48,900
September	238,500 (est.)	57,500 (est.)
October	239,000 (est.)	73,200 (est.)
November	238,300 (est.)	72,300 (est.)
December	237,800 (est.)	78,500 (est.)
Total	2,873,061 (est.)	774,567 (est.)

(Total in barrels daily is 54,328 (est.) Conversion factor used is 6.902 bbl per metric ton.)

AUSTRIA—Crude Production

COMPANY	BARRELS 1957	1956
Austrian Mineral Oil Administration	20,413,443	22,041,228
Erdoel Produktions Gesellschaft	244,748	266,648*
Rohoelgewinnungs Gesellschaft	778,583	744,907
Van Sickle Co.	186,717	214,787
Total	21,623,491	23,267,570

*In 1956 the production figure included both AMOA and EPG production in the Goesting oil field.

Gas production is rising steadily; 1957 production was around 26.8 billion cubic feet, about 1.8% over 1956. Production in 1958 is estimated to have risen to 27.5 million cubic feet, up 2.6%.

Total producing wells held by OeMV in Austria at the beginning of 1958 were 824. Of these, 222 were flowing wells, 16 gas-lift, and 586 pumpers.

Reserves: Proved petroleum reserves in Lower Austria are estimated by the government at roughly 55 million tons (about 412,500,000 bbl, using 7.5 bbl per ton) as of January 1, 1957.

TRANSPORTATION: At present, there are less than 100 miles of pipeline in Austria. They include one small line of about 40-km length to Sokeral; one natural-gas line to Vienna; and one crude line to Lobau refinery. The government and a private company are about to build a network of gas lines, government-financed with about 100 million schillings.

In 1958, OeMV finished laying a 22-mile 15.65-in. pipeline from Zwerndorf gas field across the Danube to Schwechat refinery. From Schwechat, in April, NIOGAS completed laying a "southern gas pipeline ring" connecting Baden, Ebenfurth, Fischamend, Wiener Neustadt, and other industrial areas. Annual gas-delivery capacity from OeMV thus far is 8.83 billion cubic feet. NIOGAS also is laying a "western gas pipeline" from Bockfliess to Korneuburg, Stockerau, and Tullin—later to be continued to Mautern in a southerly direction to St. Poelten.

The German firm Mannesmann built a 45-mile 12-in. gas line for Ferngas, connecting Semmering (near Vienna) with Donawitz, near Loeben.

REFINING: No changes have occurred in the tabulation of refineries carried in *World Petroleum Report—1958*. Of the total 47,410 b/d capacity there, only a small part is in private hands; the rest is owned by the government's OeMV, and operates at a loss of some $4 million per year.

The Lobau refinery has been returned to its owners, Mobil and Shell; but, under a temporary agreement still in effect, OeMV, the government oil agency, is continuing to operate the refinery.

One of the most controversial issues of the *Vienna Memorandum* of May 10, 1955, the restitution of the French pre-World War II interest in the Schwechat refinery near Vienna, has finally been settled. The French claim of the Ste. Francaise Industrielle et Commerciale des Pétroles (SPCIP, now called Ste. Finançière et Industrielle des Pétroles—FIP), valued at 50 million schillings ($2 million), has been compensated by the transfer of 51% of the shares of Donau Insurance Co. (held by the Austrian government) to FIP. Another 15.9% of the Donau Insurance shares, valued at 12 million schillings ($480,000), will be sold by the government to a purchaser to be named by FIP.

A new 32,000 b/d refinery is under construction by OeMV at Schwechat, in the neighborhood of the old OeMV plant. The capacity of 1.6 million tons (32,000 b/d) corresponds to the expected crude yield of Austria during the period 1960-70. By 1965—in which year the Austrian crude deliveries to the USSR under the terms of the *State Treaty* will come to an end—Austria may be obliged to import crude oil, provided no new oil fields have been discovered by then. If it turns out that the prospects for new oil fields are more promising than they are now, the capacity of the new refinery will be increased to 2.5 million tons per year. The plant is designed for Austrian and Middle East stock.

MARKETING: Domestic consumption of oil products in Austria reached 938,000 metric tons in January-June 1958, compared with 860,000 same 1957 period. Total 1957 consumption was 1,892,000 tons; 1,790,000 in 1956. First-half 1958 motor-gasoline consumption was 15% higher than in 1957; gas-diesel 13% higher; fuel oil 3% higher. OeMV raised (January 1958) its price for one ton of crude by about 78%, to $24.64 from $13.44. The prices of products were not affected.

Reparations: The Soviet government agreed in 1958 to cut by 50% the still outstanding Austrian crude delivery quota of seven million tons (about 52.5 million barrels). Under the terms of the State Treaty of 1958, the USSR was to receive from Austria (in addition to other materials) 10 million tons yearly of crude oil. Austria's oil never actually went to the USSR, but to Hungary, Czechoslovakia, Poland, and East Germany—covering about one-

AUSTRIA—Oil Consumption
(Metric Tons)

	From Domestic Sources Est. 1958	1957	Imports Est. 1958	1957	Total Consumption Est. 1958	1957
Motor gasoline	235,000	224,840	195,000	143,927	430,000	368,767
Aviation gasoline	7,000	9,276	7,000	4,230	14,000	13,506
Kerosine	15,000	16,938	—	—	15,000	16,938
Gas oil	390,000	349,855	6,000	1,318	396,000	351,173
Heating oil	600,000	794,384	400,000	186,719	1,000,000	981,103
Lubricating oils	52,000	53,233	30,000	27,743	82,000	79,546
Bitumen	54,000	45,427	38,000	17,876	92,000	63,303
Total	1,353,000	1,493,953	676,000	381,813	2,029,000	1,875,766

quarter of their import requirements. Austria will continue delivery of the remaining seven million tons of oil, while the Soviet Union was to supply to Austria 3.5 million tons of Soviet oil as of January 1, 1959.

OIL LAWS*

Exploration and production operations in Austria continue to be subject mainly to the old Bitumens Law. A resume of the law, which is very simple but generally workable, is contained in *World Petroleum Report—1957*. Royalty payment to the Austrian government by foreign operators on the old concessions amounts to a mere 6%. The newer contract signed with NIOGAS (State-owned gas-development company) provides for a 30% royalty, whereas the actual rate paid by OeMV (in direct deliveries and price subsidies) may be as high as 55% of income. Both these entities are government-owned and, unlike private companies, pay only nominal income taxes. Therefore, part of the high royalties compensate for lower fees and taxes.

Unification of royalty and tax policies is imperative for the Austrian government for various pressing reasons—particularly the internal domestic situation. Austrians resent what they regard as more favorable treatment to foreigners than to State-owned entities.

Settlement of the *Vienna Memorandum* controversy between the government and Shell-Mobil Oil companies may be reached via a company proposal of April 1958. The companies proposed a 50-50 partnership with the government's OeMV through RAG, their jointly owned subsidiary, over the Matzen area, as well as Hollabrunn and concession areas in the southern Vienna basin; in Burgenland province, and in areas adjoining RAG's present concessions in Lower Austria (all of which were included in a government proposal of December 1957) plus the Laa area and RAG's present concession areas in Styria and Upper Austria. Not part of the companies' offer is a similar arrangement in refining—with the companies to have minority interest in the OeMV refinery at Schwechat, now under construction, plus diversion of 37% of OeMV's production (after reparation payments) to go to the Shell and Mobil refineries at Floridsdorf and Kagran.

For a resume of the negotiations which have led up to the *Vienna Memorandum*, see *World Petroleum Report—1958*.

*Translations of the compete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

BELGIUM

PHYSICAL DEVELOPMENT

EXPLORATION: There were no concessions held for oil or gas exploration in the country, as of November 6, 1958, according to the government's Mines Division, Geological Service.

Some interest has reportedly been shown, however, in the oil and gas possibilities of northeastern Belgium, along the Dutch border, in the past year. A sedimentary section of considerable thickness exists there, and prospects may be enhanced by discoveries made in western Holland in recent years.

Société Campinoise de Réchèrches et d'Exploitations Minières, a group formed by Petrofina and certain Linbourg coal interests, is reportedly awaiting action on an exploration permit application covering 1,467 square miles in northeastern Belgium. When queried, Petrofina replied, however, on December 1, 1958, that "we have not recently applied for a concession in Belgium." Various wells drilled since 1949 in this area, the deepest to 2,170 meters (7,161 ft) had indicated favorable stratigraphic conditions for oil occurrence.

PRODUCTION, REFINING, MARKETING: There is no production of oil in Belgium, but a healthy refining industry exists, as shown by the accompanying tables. All crude processed is imported.

OIL LAWS*

Laws governing petroleum exploration and exploitation are as follows: 15-9-1909. Royal Order on Mines; 28-11-1939, Royal Order No. 83 concerning the exploration and exploitation of bituminous rocks, oil, and combustible gas; 28-11-1939, Royal Order for the compulsory declaration of exploration of the subsoil; 7-4-1953, Royal Order laying down the procedure and conditions for examining applications for exclusive licenses for the exploration and exploitation of oil and combustible gases. *Source: World Petroleum Report, Editorial Department, 604 Fifth Avenue, New York 20 N. Y., where copies of these laws are kept on file.*

*Translation of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave, New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

Governmental attitude, labor situation, and the political situation appear favorable to investment, so far as is known. Taxation is rather high, with the corporation earned income tax on net profits not distributed to shareholders rising from 25% on the first 150,000 Belgian francs ($3,000) to 40% over 10 million francs (US $200,000). Foreign corporations pay a flat 40% on all new profits; however, under the tax convention with the United States, USA corporations do not pay higher income taxes than Belgian corporations. There is an additional 20%, which may be abolished for all corporations paying their estimated earned income tax prior to the 15th day following the closing date of the fiscal accounting period.

BELGIUM—Product Prices
GASOLINE

Zones	Standard	Premium	Kerosine
0	6.32	6.72	3.14
1	6.37	6.77	3.19
2	6.42	6.82	3.24
3	6.49	6.89	3.31

Price in Belgium francs[1] per liter (includes tax)
Effective for gasoline: July 19, 1958.
Effective for kerosine: August 6, 1958.

[1] $1.00 equals 50 Belgium francs.

BELGIUM—Oil Refineries
(As of July 1, 1958)

Company	Location	Crude CAPACITY (Barrels per Calendar Day)	Cracking CAPACITY (Barrels per Calendar Day)
"Albatross" SA Belge pour le Raffinage de Petrole	Antwerp, Kiel[1]	14,000	4,500 C
Belgium Shell Co. SA	Ghent	3,000 SLA	—
Compagnie Industrielle "Atlas" SA	Hoboken-Antwerp	2,500 S	—
Esso Belgium SA	Antwerp[2]	35,000 SC	11,000 C
Raffineries Belge des Pétroles	Antwerp[3]	18,600 SC	—
Raffineries et Distilléries Anversoise SA "Radian"	Antwerp[5]	8,500 S	—
Soc. Industrielle Belge des Pet.	Antwerp[4]	90,000 SCA	10,000 C
	TOTAL	171,600	25,500

[1] 700 b/d cat poly. [2] 4,000 b/d thermal reforming; 5,000 b/d cat. reformer; asphalt plant and 6,000 b/d Hydrofiner. [3] 2,600 b/d thermal reforming; 2,500 b/d cat. reforming; 5,000 b/d asphalt topping and 5,000 b/d cat. desulfurizer building, 1959 completion. [4] a. 10,000 b/d Hydrofiner; 10,000 cat. reformer; 3,000 b/d cat. poly; 6,000 b/d thermal reformer. [5] 750 b/d cat reformer. S—Skimming; L—Lubricating; A—Asphalt; C—Cracking. Under cracking capacity to indicate type: C—Catalytic.

CYPRUS

PHYSICAL DEVELOPMENT

EXPLORATION: There is little exploration. Forest Oil Corp. of Bradford, Pa., a long-established independent oil company, has an exploration license covering most of the island which can be converted to a prospection license, if the company so desires. A Forest photogeological crew worked during 1958, and a seismic crew may be sent there soon. A local resident has been drilling a well for a number of years, with no results reported.

PRODUCTION, REFINING, MARKETING: There is no production or refining on the island. Marketing needs are small, and all imported.

OIL LAWS*

There is a mining law, Law No. 14 of 1953, but this law contains very little concerning oil. There is no legislation governing oil as such.

Forest will conclude a new concession contract very soon, according to the company. It will spell out the terms for both exploration and exploitation operations, and the company hopes to include both in a single agreement. END

*Copies of the Model Exploration Prospection and Mining Leases referred to are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y.

BLUEPRINT for Economic Achievement

When refining capacity must be increased, an oil company's planning group has to evaluate the technical and economic pros and cons of modernizing by degree or scrapping outmoded facilities and rebuilding completely. When the decision is to start from scratch, hundreds of variables are involved in choosing location, type and range of crudes, product mix, process line up, degree of integration, and refinery size. Which combination will insure the optimum in efficiency, economy, yields, flexibility for the future, and return on investment?

Faced with exactly this time-consuming multiplicity of problems, The Standard Oil Company of Ohio first scheduled decision deadlines for each planning phase, then called upon Kellogg for refinery material balances, estimated process investment costs, operating information, and data on various crudes. Decisions from this study, each made on schedule, served as the blueprint for Kellogg's second assignment—engineering and constructing an integrated new plant at Toledo, Ohio. Designed for a capacity of 60,000 BPSD, this $40 million refinery is an outstanding example of sound economics at work in plant planning and execution.

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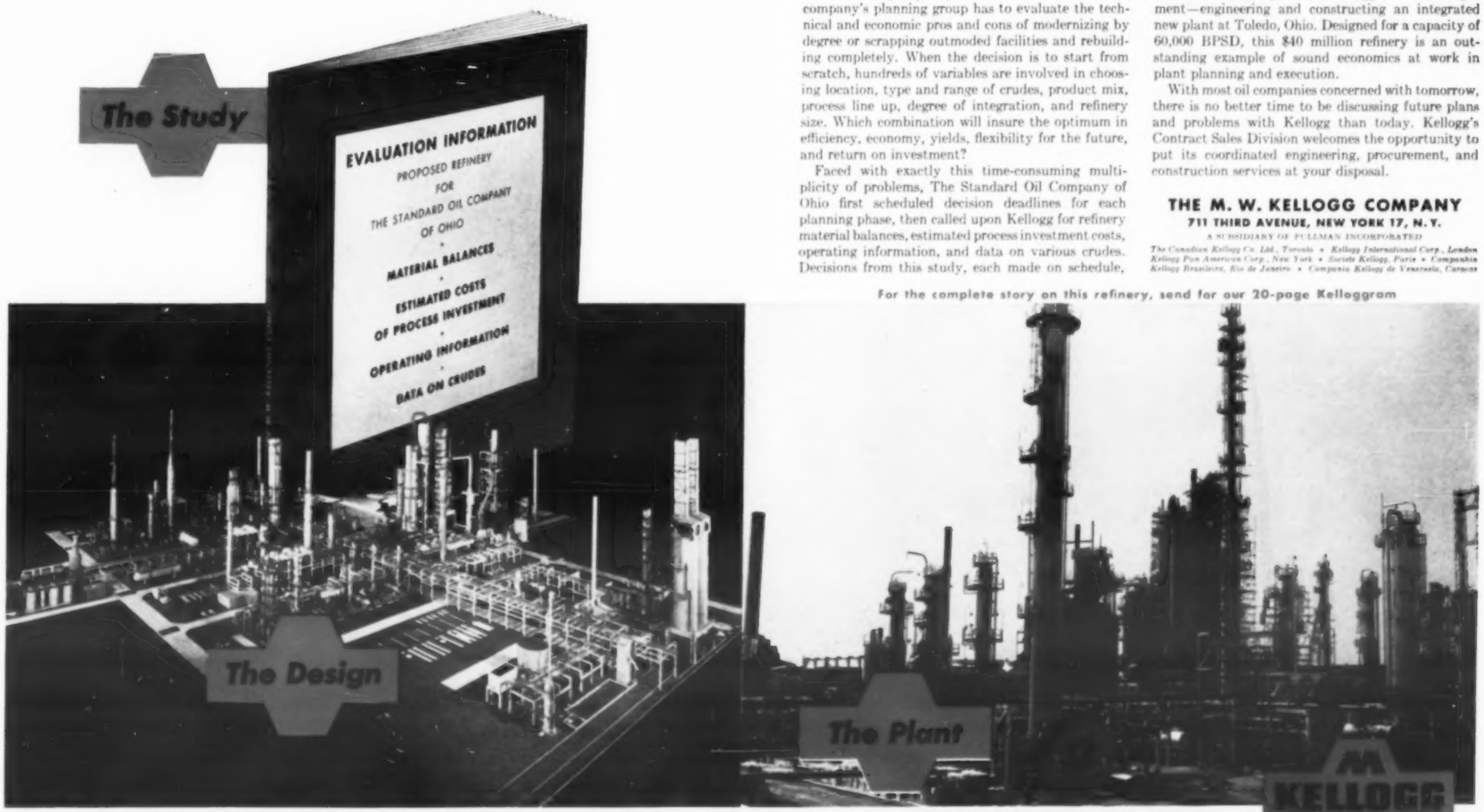


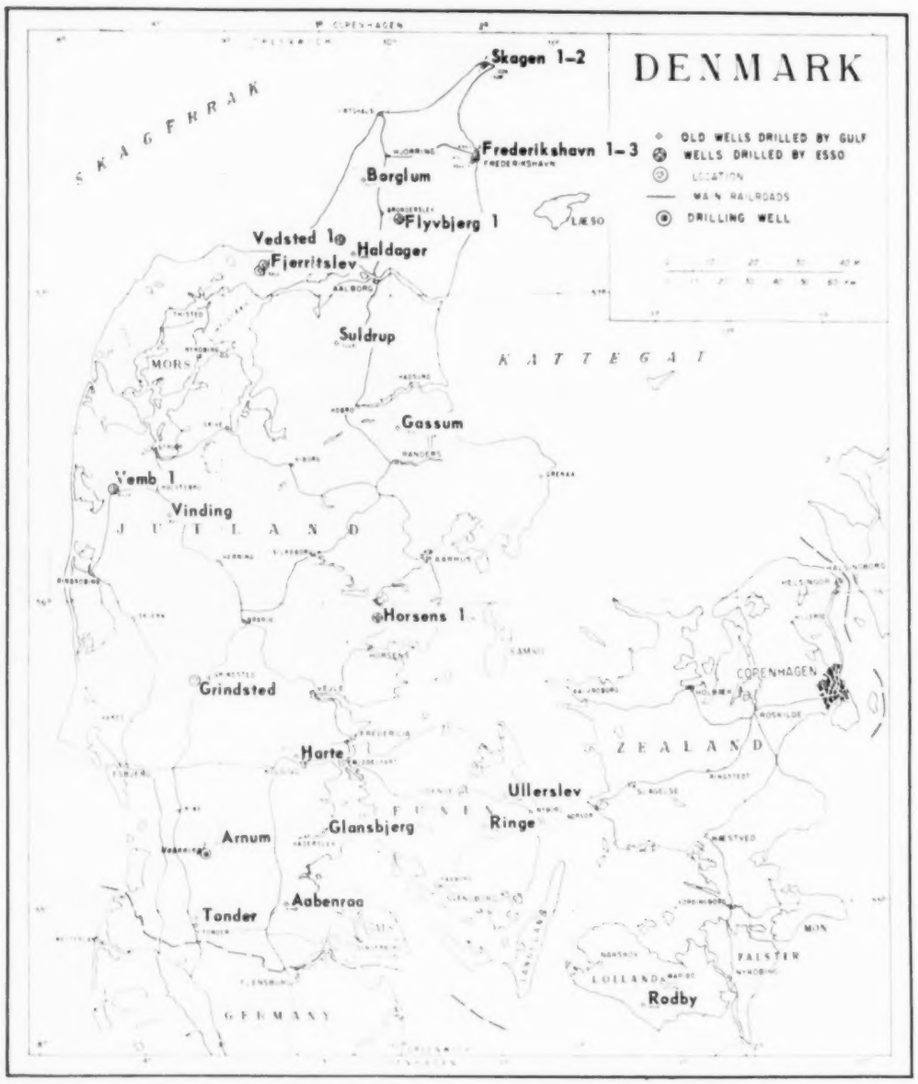
To achieve the ultimate in design, yet assure the most economic plant, Kellogg built this 25' x 29' scale model concurrently with designs to assist all levels of management, as well as all categories of engineering and refinery personnel, in design reviews well in advance of major construction.

Construction almost completed, the major sections of the integrated refinery shape up as: (left to right) the saturate gas plant, the crude section, catalytic cracker, unsaturate gas plant, catalytic polymerization section, and the delayed coker.

DENMARK

PHYSICAL DEVELOPMENT

EXPLORATION: Denmark's oil possibilities are bleak. Danish American Prospecting Co. (Standard of New Jersey) took over in 1957 the 16,576-square-mile concession over all of Denmark acquired by Gulf Oil Corp. in 1938 (see *World Petroleum Report 1958*, p. 174). Standard is drilling its ninth well after having drilled eight dry holes in little more than a year. The accompanying map and table show the location and status of drilling in Denmark. All wells so far have been in salt basins. The company has some more structures to drill; if no encouragement is received, effort may cease in 1959.



REFINING, MARKETING: Denmark is one of the few countries in Europe without a full-scale refinery. A 3,000 b/d to 3,500 b/d cracking plant, owned by A. P. Moller, produces town gas for Copenhagen, and a small bitumen plant at the seaport of Kalundborg has an annual capacity of 30,000 tons.

After a long period of rapid expansion, demand for oil products in Denmark declined over 4% in 1957. Current inland consumption is at about four times the 1938 level, and represents half the country's total energy consumption.

Total Danish demand (on a crude-equivalent basis) is estimated at 86,000 b/d for 1958, 9.1% over 1957.

DENMARK—Drilling by Jersey Standard
(As of December 30, 1958)

Well	Depth (Feet)	Status
Flyvbjerg	5,573	Dry and abandoned
Vedsted	6,783	"
Fjerritslev No. 1	3,012	"
Fjerritslev No. 2	7,688	"
Vemb	6,428	"
Horsens	5,671	"
Grinsted	5,413	"
Hoenning	8,168	"
Roedekro		Drilling

OIL LAWS*

Oil is subject to Law No. 181* of May 8, 1950, designated Law on Exploration and Utilization of Raw Materials in the Underground of the Kingdom of Denmark. It designates only general conditions for concessions, and does not specify royalty or rental. Duration of concessions is set at 50 years.

The concession contract held by Danish American Prospecting Co. was granted by Royal Concession of June 2, 1950,* with amendments as per Supplementary Royal Concession of April 13, 1957.* END

*Translations of the complete text of the oil law and Standard's concession are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

EIRE (IRELAND)

PHYSICAL DEVELOPMENT

EXPLORATION: The first concession for oil and gas exploration in the Republic of Ireland was granted early in 1959. Covering virtually the entire country, the 26,000-square-mile concession is to Messman-Rinehart Oil Co., of Wichita, Kans., and Ambassador Oil Corp., Dallas, Texas. Negotiations were conducted by Madonna Oil Co., Messman-Rinehart's Irish subsidiary. Ambassador is to have an operating interest in the Irish venture.

Tentative concession terms require a 5,000-ft test within two years and an average annual expenditure of $1 million for 20 years.

Eire is located in a sedimentary basin which includes both England and Scotland. No drilling has been done, and the country's prospects are considered only fair.

An airborne magnetometer survey was completed in 1958, by the government, of the Irish Sea.

OIL LAWS*

New petroleum legislation, replacing the present law, Petroleum (Production) Act, 1918, is being formulated. END

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

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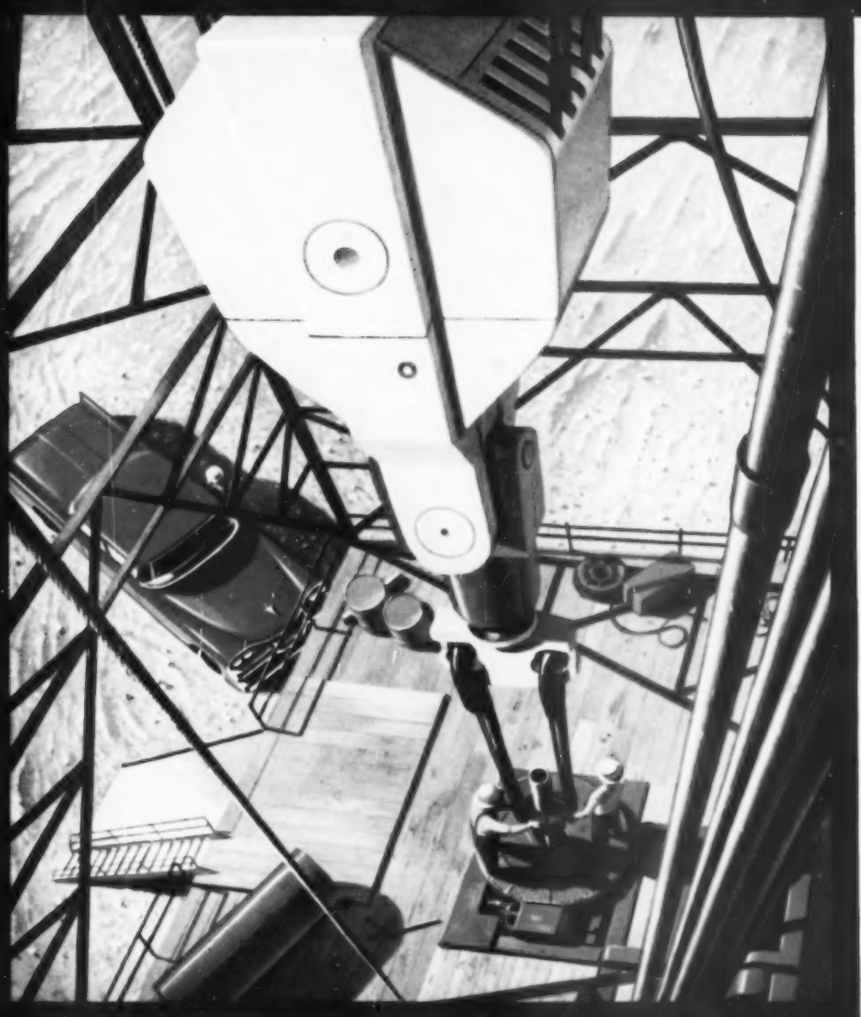

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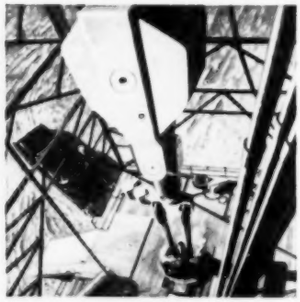

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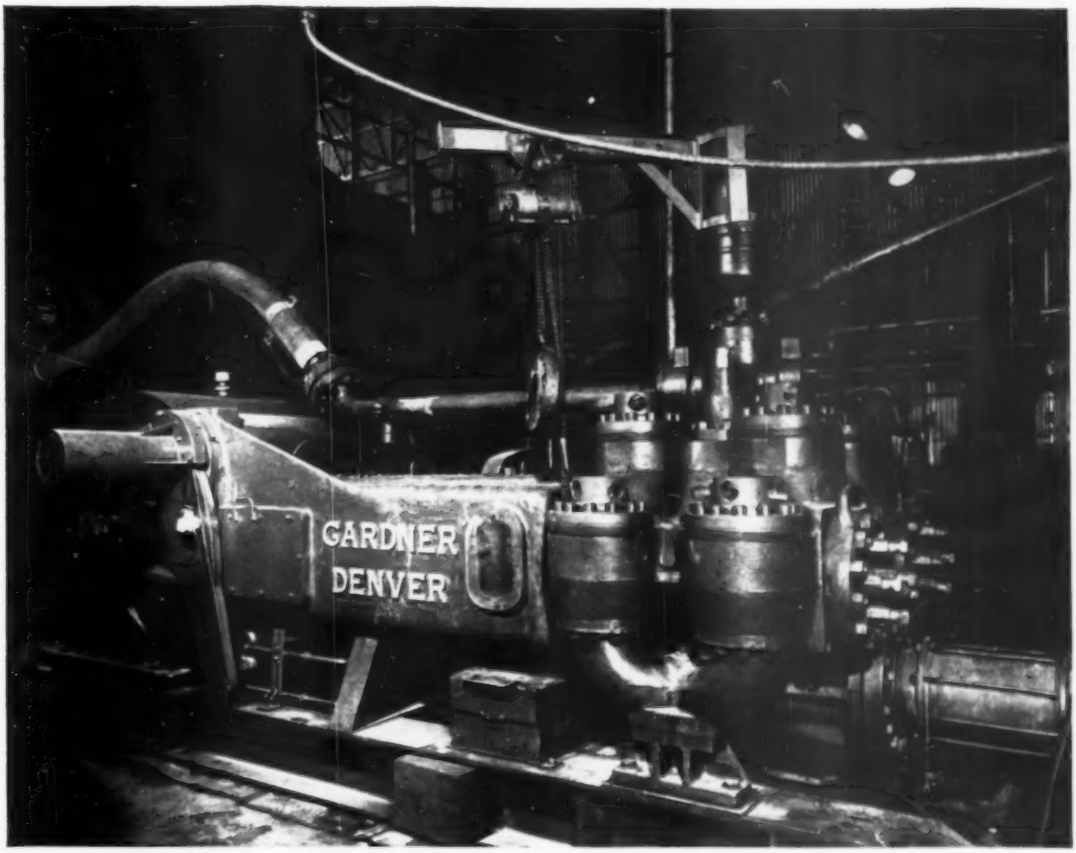

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FRANCE

PHYSICAL DEVELOPMENT

The year 1958 was one of sharp recovery for the petroleum industry in France. Consumption soared after a highly disappointing 1957. Refinery operations were back to nearly 90% of capacity after using only 75% of facilities in 1957. Production of both natural gas and crude oil rose at a satisfactory rate.

In its drive toward self-sufficiency in raw materials, the franc zone produced nearly 2.4 million tons (48,163 b/d) of crude oil in 1958, an increase of 63% over 1957. This astonishing rise brought domestic supplies to only 8% of demand, however. In 1959, it is estimated that franc-zone output will rise to about 70,000 b/d or, roughly, 10% of demand.

The way to French oil self-sufficiency is, however, through Africa and not through metropolitan fields. The millions of dollars poured into oil exploration are beginning to show results. The Sahara is expected to produce 30,000 b/d in 1959 compared with 28,000 b/d from Parentis and other lesser French fields.

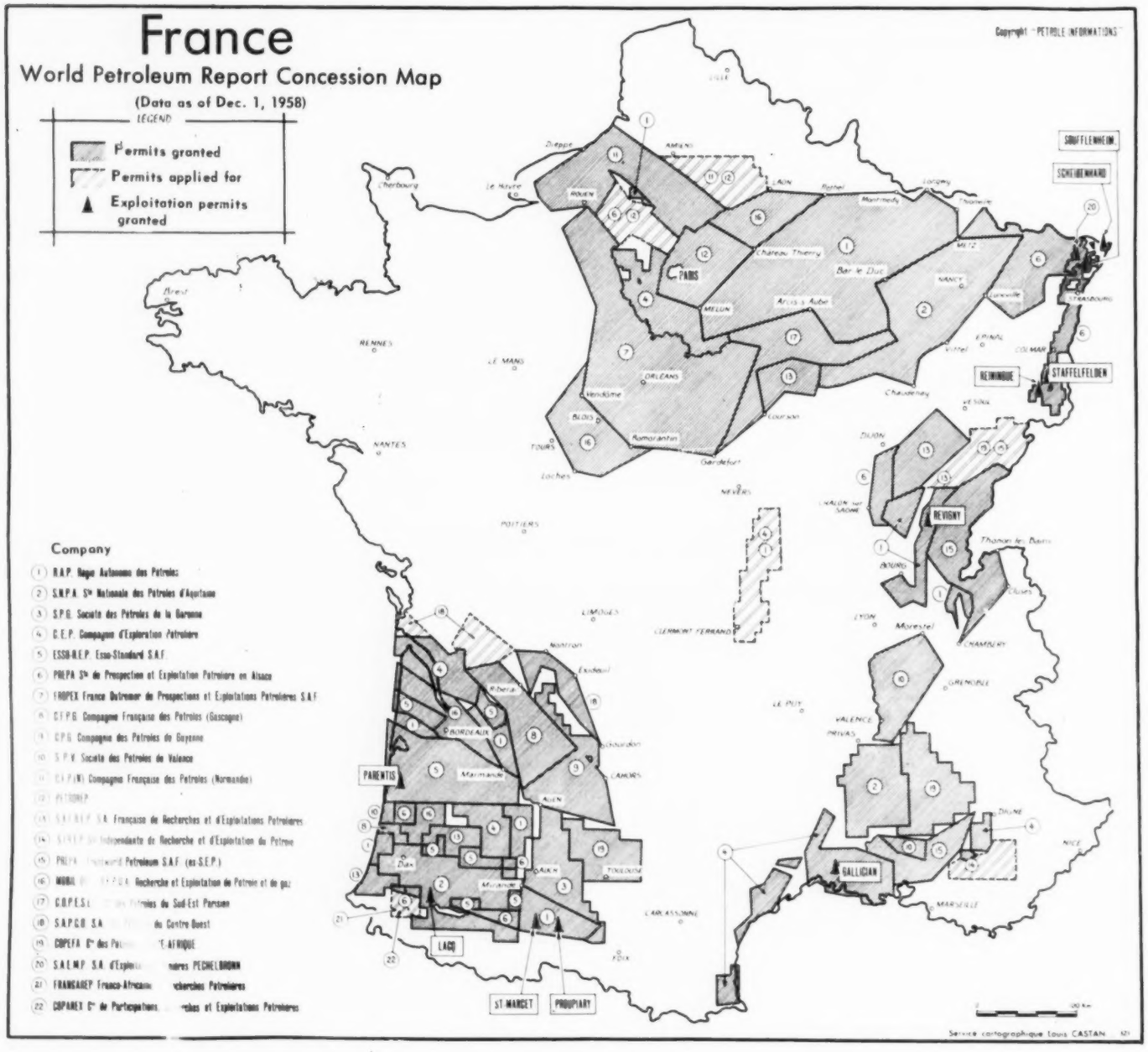
In the Sahara two, and probably three, important oil fields have been discovered with reserves estimated in the billions of barrels.

With a stable government in France, the remaining national problem is mostly economic, since large sums must be expended on pipelines and other facilities before oil in large quantities can be sent to France.

Production in the Gabon (French Equatorial Africa) is now second in French territory—behind Esso-Rep's Parentis field. Reserves are very tentatively estimated at 13 million barrels in the Gabon field. Shipments from this French West African field averaged 6,900 b/d in the first quarter of the year compared with 2,300 b/d in 1957. By July, the field had helped boost total French output to a new high of 38,474 b/d, a 25% jump over the previous year's output. Average Gabon output for the year was 8,600 b/d, and in the final quarter production averaged 10,000 b/d.

Political weather staying clear, Hassi Messaoud in the Sahara may more than triple its output in 1959, jumping from a 10,000 b/d average in 1958 to more than 30,000 b/d. The problem here is transportation, and completion

(*Continued*)


France
World Petroleum Report Concession Map
(Data as of Dec. 1, 1958)
LEGEND
Permits granted
Permits applied for
Exploitation permits granted
Copyright - PETROLE INFORMATIONS
Company
(1) R.A.P. Régie Autonome des Pétroles
(2) S.N.P.A. Sté Nationale des Pétroles d'Aquitaine
(3) S.P.G. Société des Pétroles de la Garonne
(4) C.E.P. Compagnie d'Exploration Pétrolière
(5) ESSO-R.E.P. Esso-Standard S.A.F.
(6) PELPA Sté de Prospection et Exploitation Pétrolière en Alsace
(7) FRAPEX France Outremer de Prospections et Exploitations Pétrolières S.A.F.
(8) C.F.P.G. Compagnie Française des Pétroles (Gascogne)
(9) C.P.G. Compagnie des Pétroles de Guyenne
(10) S.P.V. Société des Pétroles de Valence
(11) C.F.P.(N) Compagnie Française des Pétroles (Normandie)
(12) PETROREP
(13) S.A.F.R.E.P. S.A. Française de Recherches et d'Exploitations Pétrolières
(14) S.I.R.E.P. Société Indépendante de Recherche et d'Exploitation de Pétrole
(15) PELPA Pétroles d'Alsace Petroleum S.A.F. (ex S.E.P.)
(16) MOBIL [illegible] Recherche et Exploitation de Pétrole et de gaz
(17) C.O.P.E.S.U. [illegible] Pétroles du Sud-Est Parisien
(18) S.A.P.E.C.O. S.A. [illegible] du Centre Ouest
(19) COPEFA Cie des Pétroles [illegible] E-AFRIQUE
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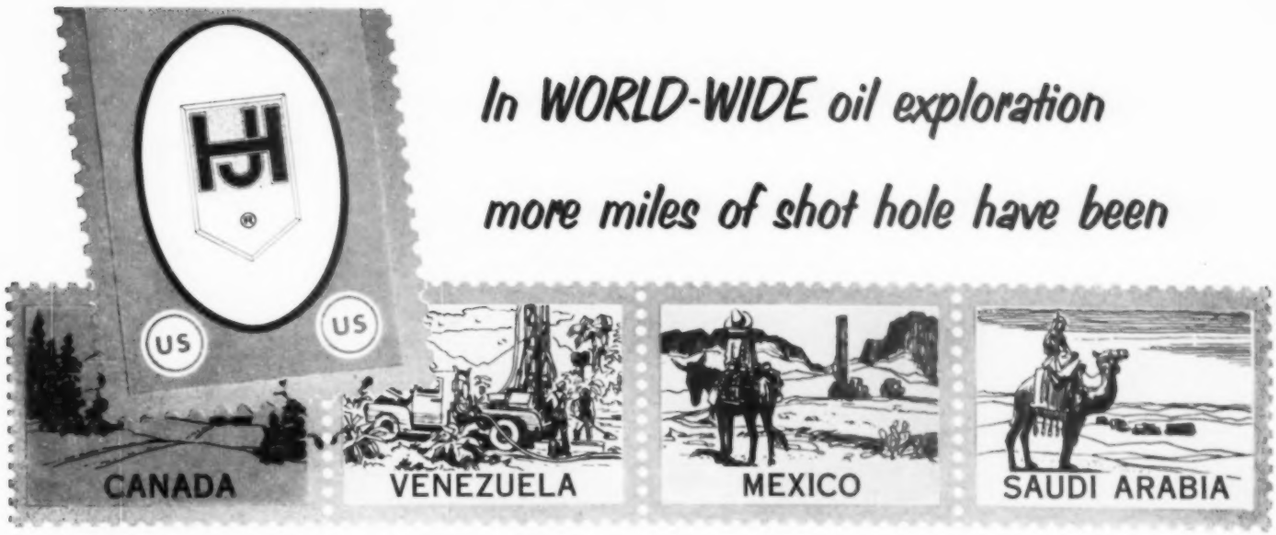

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Parisiènne (Petrorep), a privately owned French firm. This company's discovery was at Coulommes, about 27 miles east of Paris. The field is now believed to have a proved reserve of about two million metric tons. 13 wells were in production at the close of the year, and six wells drilling or testing. Latest well to be completed (E 9) may be the best one in the field thus far, since it yielded 45 bbl per hour on a production test. Coulommes has two wells which must be pumped, and three flow. Twenty-five additional wells are to be drilled in 1959. The Coulomme formation is middle Jurassic, found at about 6,100 ft.

Second 1958 discovery was by Fropex, a Franco-American concern owned 55% by Cie. d'Exploration Pétrolière and 45% by a Caltex affiliate. The field is 70 miles south of Paris, near Chateaurenard. Oil was found in an 8-ft interval at 1,845-53 ft in the lower part of the lower Cretaceous, a formation in which a show of oil has never previously been encountered in the Paris basin. On test, the well swabbed 63 bbl of oil before going to water. Further work resulted in completion at about 30 b/d.

The third Paris basin field was at Chailly, 40 miles southwest of Paris, by Cie. d'Exploration Pétrolière (CEP). This wildcat produced 38 bbl of good-quality oil on an 8-hour test of a formation found at 5,469-74 ft. A fourth test at Nangis by RAP obtained good oil shows in December 1958 at 2,087 meters in the Dogger limestones. Drilling is continuing.

1953, and was completed in January 1956, the work having been done in cooperation with French geologists of Cie. d'Exploration Pétrolière (CEP) since October 1954. On September 1, 1955, France-Outrmêr de Prospections et Exploitations Pétrolières SAF (FROPEX), a subsidiary of American Overseas Petroleum (France) SAF (AMOFRANCE), and CEP was granted four exploration permits in the Paris basin covering 7,659 square miles. The first, of up to four seismic parties, started operations in September 1955 for the joint account of the two parties, and the last party was terminated in July 1958. The seismic reconnaissance survey covers approximately 75% of the four permits held by FROPEX.

The first well, Sennely No. 1, located 20 miles southeast of Orleans, was spudded December 17, 1956, and drilled to a total depth of 7,049 ft. Since then, five more wells have been drilled: Marchenoir—3,193 ft; Vernon—3,719 ft; Houlbec—2,352 ft; Marville—3,277 ft; and Chateaurenard No. 1 (located 65 miles southeast of Paris) drilled to a located depth of 6,483 ft.

At a depth of 1,850 ft, Chateaurenard No. 1 well discovered oil in a thin Lower Cretaceous sand.

Boiscommun No. 1, 54 miles south of Paris, was spudded August 10, 1958 and, as of September 8, was at 2,598 ft. Prey No. 1, 50 miles west of Paris, was spudded September 6, 1958 and, as of September 8, was at 256 ft.

Chateaurenard No. 2, located one mile north-west of the discovery well, was spudded September 6, 1958 and, as of September 8, was at 335 ft.

Esso REP drilled its second successful well at Mothes, nine miles northeast of the Parentis field, early in the year. The 1955 discovery had been followed by two dry holes. Mothes No. 4 came in at 8,000 ft, apparently in the dolomite. On a 2-hour test, it produced at the rate of 1,400 b/d. The original discovery flows 315 b/d on regular production.

Esso also continued development of the Parentis field, discovered in 1954. At the close of the year there were 17 producing wells in the field yielding about 23,000 b/d. An active repressuring program is being conducted to maintain optimum reservoir conditions. Three wells were used for injection.

Interest of the oil industry in the possibility of developing commercial oil production in the French Union may be seen in the growing area covered by exploration and exploitation permits granted by the government to various enterprises. At the end of 1957, there were permits covering 1,340,790 square kilometers in the Union compared with 59,850 square kilometers 10 years earlier. The big change had come in 1952 when leasing became active in the Sahara.

(*Continued*)

of a large-diameter line should cause an immediate rise in output to at least 100,000 b/d.

Output of wells in metropolitan France was virtually unchanged in 1958, with Parentis producing 80% of the country's domestic supply. The record in recent years has been as follows:

	Metric Tons
1958	1,440,000 (est.)
1957	1,410,490
1956	1,263,645
1955	878,420
1951	290,780
1949	57,950

EXPLORATION: The search for oil in the French Union was intensified in 1958, and was expected to cost 80 billion francs ($190.4 million) against 62.7 billion francs in 1957, an increase of 11.6%. Drilling for the year is estimated at 850,000 meters (2,788,000 ft) as compared with 501,466 meters in 1957, an increase of 69%. The drilling that year was in turn an increase of 50% over 1956. The record in recent years follows:

	Completions	Meters Drilled	Average Depth
1957	314	501,466	1,459
1956	233	345,011	1,490
1955	225	310,050	1,355
1954	257	306,000	1,183
1953	223	272,300	1,220
1952	206	268,900	1,197
1951	193	236,900	1,285
1950	171	189,800	1,100

Roughly half of the drilling in franc territory is in metropolitan France. In 1957, there were 155 completions in France, 26 in North Africa, 61 in the Sahara, and 72 in overseas territories. Average depth of wells was somewhat less in metropolitan France than elsewhere. Total drilling in 1957 was 224,534 meters in France, 39,427 in North Africa, 121,371 in the Sahara, and 116,134 in overseas areas.

There were three new finds in metropolitan France in 1958. The first was made by the Ste. de Réchèrches Petrolières dans la Région

WELLS DRILLED IN FRANCE AND FRENCH UNION 1946-1957
(Including Oil, Gas, and Dry but not including Stratigraphic Tests)

	FRANCE				A.F.N.				SAHARA				T.O.M.			
	E	Ext.	Exp.	T	E	Ext.	Exp.	T	E	Ext.	Exp.	T	E	Ext.	Exp.	T
1946	9	2		11	14	4		18					—	—		
1947	23	2		25	1	—	3	4								
1948	23	4		27	30	13	3	46					1			1
1949	26	2		28	40	18	4	62					1			1
1950	50	13		63	67	24	14	105					5			5
1951	57	13	91	161	68	14	20	102					4			4
1952	46	15	7	68	58	32	23	115	1	—		1	23			23
1953	40	3	3	46	69	20	28	117	2	—		2	19	6		25
1954	34	18	1	53	77	3	47	127	13	—		13	12	4		16
1955	48	25	14	87	32	19	13	64	16	—		16	12	3		15
1956	91	15	11	117	28	4	9	41	14	9		23	16	11		27
1957	83	29	10	122	12	10	4	26	19	24		43	23	34	9	66

NOTE: A.F.N.—Morocco, Algeria, Tunisia.
T.O.M.—Senegal, Ivory Coast, Gabon, Middle Congo, Cameroons (Fr.), Madagascar, New Caledonia.
E—Exploratory. Ext.—Extension. Exp.—Exploitation. T—Total.

To help finance the heavy cost of finding and developing French oil reserves, a new company, Ste. Nationale de Finançement des Réchèrches de Pétrole, is to be formed with an initial capital of 10 million francs. Bureau de Réchèrches de Pétrole (BRP) will transfer its interest in various companies to the new financial company.

Geological field work in the Paris basin was started by Amoseas' geologists in February

DRILLING IN FRANCE AND FRENCH UNION
(Excluding shallow wells)
(Figures in Thousands of Meters)

	FRANCE	A.F.N.	SAHARA	T.O.M.
1946	24.8	12.5	—	—
1947	37.3	31.3	—	—
1948	41.5	70.9	—	3.2
1949	44	82	—	3
1950	75.9	107.6	—	6.3
1951	95.1	132.3	—	9.5
1952	111.2	128.8	1.5	27.4
1953	84.7	153.9	3.9	29.8
1954	93.6	152.4	30.7	29.3
1955	146.6	102.4	37.9	23.1
1956	175.8	45.4	62.6	61.2
1957	224.5	39.4	121.4	116.1

NOTE: A.F.N.—Morocco, Algeria, Tunisia.
T.O.M.—Senegal, Ivory Coast, Gabon, Middle Congo, Fr. Cameroons, Madagascar, New Caledonia.

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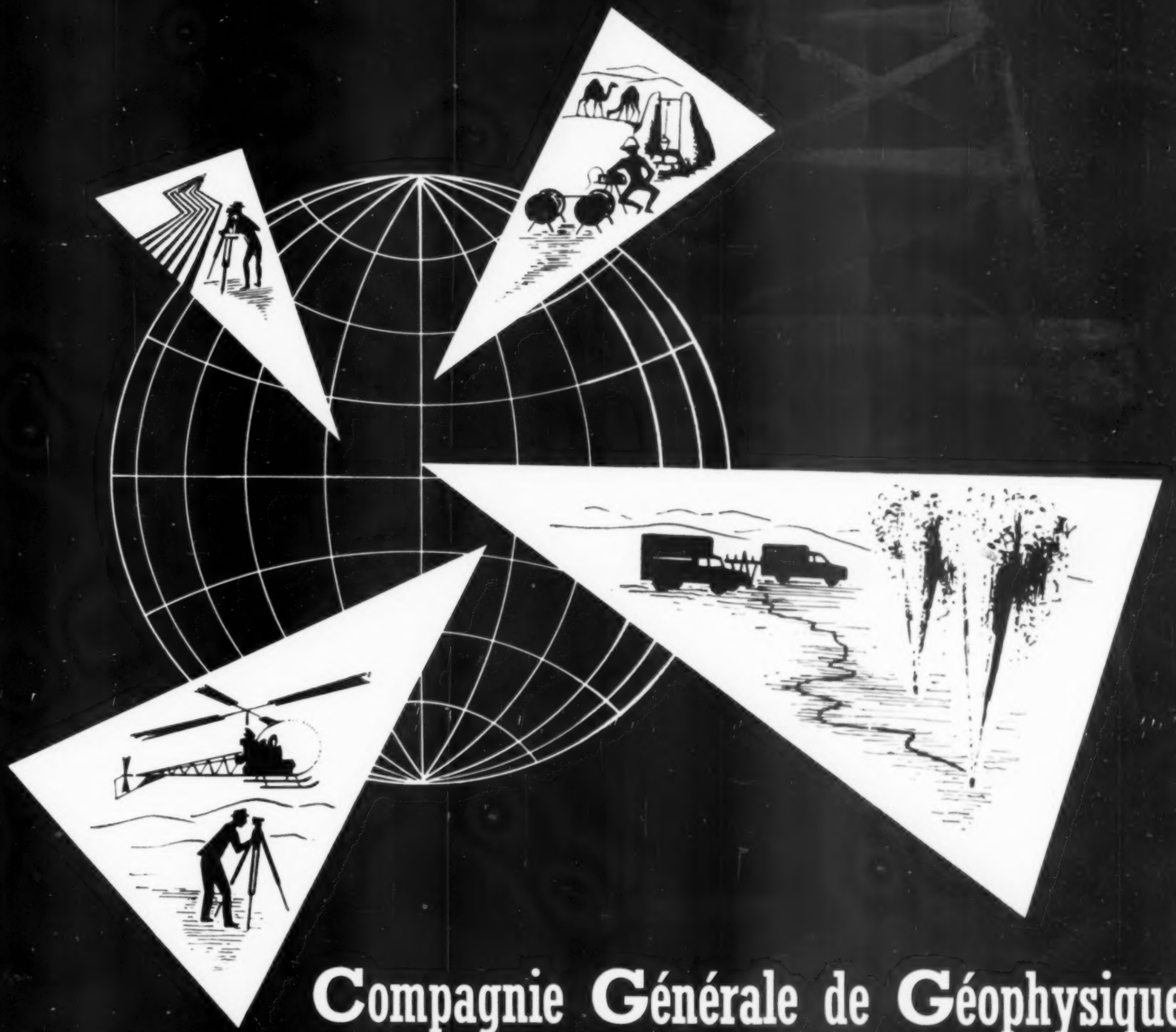

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FRANCE *(continued)*

Following is a record of permits in recent years:

	Metropolitan France	North Africa Sahara	Overseas Territories
	(Square Kilometers)		
1957	197,962	788,098	354,730
1956	158,617	742,030	345,090
1955	133,614	754,865	304,602
1954	98,786	753,377	323,217
1953	100,997	789,376	323,217
1952	67,895	665,359	323,217
1951	70,093	110,538	322,550
1950	69,116	94,374	321,050

NATURAL GAS: A highly important source of energy for France in recent years has been natural gas. Preliminary estimates indicate that raw-gas production in 1958 approximated one billion cubic meters, compared with 547 million cubic meters in 1957 and 343 million in 1956.

The most important gas reserve thus far found is the Lacq field operated by Ste. Nationale des Pétroles d'Aquitaine (SNPA), which was not brought to commercial production until 1957 because of difficulties in extracting hydrogen sulfide from the very sour gas, containing 15.2% H_2S. Lacq has an estimated reserve of 250 billion cubic meters (14 trillion cubic feet). Before 1947, France's principal source of gas was the Saint Marcet field, operated by Régie Autonome des Pétroles (RAP), which produced 378 million cubic meters in 1957 and 330 million in 1956.

Sulfur-extraction facilities were increased in 1958, and it now is estimated that Lacq sweet-gas production can be doubled in 1959. Sulfur output is expected to exceed 300,000 tons.

A network of distributing lines is being laid to deliver Lacq gas throughout southern France and as far north as Paris. Underground storage has been prepared to receive 200 million cubic meters to take care of seasonal fluctuation in demand. Current plans are to increase Lacq output to four billion cubic meters in 1961 and sulfur output to 1,410,000 tons. Other byproducts will be 1.8 million barrels of motor fuel and 1.5 million barrels of LPGas per year. Sulfur will be a marketing problem, since France consumes only 650,000 tons per year. Natural gas will be used for petrochemicals as well as for heat and power.

Natural-gas production in recent years has been as follows:

	Millions of Cubic Meters
1958	1,000 (est.)
1957	547
1956	330
1955	274
1954	268

In 1957, Esso produced two million cubic meters, its first commercial production; SNPA, 167 million; and RAP, 378 million. North African output totaled nine million cubic meters in 1957, compared with 13 million in 1956, 12 million in 1955, and 10 million in 1944.

LPGas and natural-gasoline output in metropolitan France is produced only by SNPA and RAP in the two gas fields. Output has been as follows in recent years:

	Propane	Butane	Natural Gasoline
	(Thousands of Tons Per Year)		
1957	5.4	10.1	19.3
1956	4.7	8.4	14.2
1955	4.0	7.5	12.3
1954	4.0	7.4	12.4
1953	3.8	6.7	11.8

In addition, SNAP produced 2,300 tons of motor fuel from natural gas in 1957.

TRANSPORTATION: In the past, oil refining has been confined to the coastal regions of France where crude could be brought in easily by tanker. Refined products have been distributed by pipeline, railroad, barges, and tank trucks. Principal products line is a 10-in. pipeline from the group of four large refineries in the vicinity of Le Havre to the dense Paris market. During 1958 Esso REP laid a crude line from its Parentis field to Ambès, where a new refinery has been under construction.

Plans now are afoot to build a large-diameter crude line from Marseilles to the Strasbourg area and the head waters of the Rhine in Germany. The proposed line would deliver Middle East and African crude to the big industrial market in the upper Rhine valley.

A consortium of French bankers has been formed to raise a billion francs in domestic and foreign money markets to finance the proposed Sahara and Strasbourg pipelines. The group will operate under the name Cie. Eurafricaine pour le Finançement des Pipelines.

To deliver Lacq gas to Nantes, Paris, and east-central France, a $250 million pipeline system is planned. Paris will be served by a 550-mile main line of 20- and 24-in. pipe. The total new gas-distributing system is expected to embrace 1,000 miles of main line.

Except for the drop in 1957, there has been a steady increase in traffic through the Le Havre-Paris products line since it first was placed in service. Nine products are carried by the line compared with three in 1953. In 1957, traffic included 735,100 cubic meters of motor gasoline, 288,300 cubic meters of premium gasoline, 69,000 cubic meters of aviation gasoline, 11,200 cubic meters of jet fuel, 3,000 cubic meters of kerosine, 159,500 cubic meters of gas oil, and 323,100 cubic meters of fuel oils. Total traffic in 1957 was 1,586,200 cubic meters compared with 1,741,600 in 1956; 1,362,200 in 1955; 818,600 in 1954; and 402,700 cubic meters in 1953.

France received 22.5 million tons of petroleum in 1957 by tanker, of which 66.6% was carried in vessels flying the French flag, and 33.4% in foreign bottoms. Highest percentage carried in French vessels in recent years was in 1955 when 71.4% was received from national tankers.

Tanker unloadings in recent years follow:

	Tons
1957	22,536,764
1956	23,625,439
1955	22,029,049
1954	19,939,119
1953	17,531,923
1952	16,578,305
1951	16,431,385
1950	13,420,000

INTERNATIONAL TRADE: France found it necessary to import more finished products in 1956 and 1957 because of the Suez crisis, and exports of refined oils from French refineries were curtailed during the same period. The record in recent years follows:

	Tons			
	Imports		Exports (Products)	
	Crude	Products	Foreign	French Union
1957	24,062,400	2,743,600	1,757,700	2,204,700
1956	25,012,600	1,288,100	2,384,800	2,580,700
1955	24,738,300	941,800	3,201,200	2,339,400
1954	23,639,500	747,100	3,799,300	2,154,000
1953	21,982,500	477,200	4,524,500	2,164,800

Bunker-oil sales to vessels of foreign origin have been relatively steady in recent years: 583,700 tons in 1957; 725,300 tons in 1956; 541,600 in 1955; 539,200 in 1954; and 553,100 in 1953.

REFINING: For a list of operating refineries in France, see *World Petroleum Report—1958*.

France's 13 refineries which process crude oil treated about 600,000 b/d in 1958. This compares with a throughput of 466,000 b/d in 1957 and 500,000 b/d in 1956. The 29% increase in 1958 over the previous year was abnormally large because of the effect of the Suez crisis. Between 1956 and 1958, the increase was only 20%—which more nearly represents the expansion of the French economy.

At the close of 1958, the rated capacity of French refineries was 33,685,000 tons (673,000 b/d), so that operations for the year were, roughly, 89% of capacity. This compares with an operating rate of less than 75% in 1957. The

(Continued)

FRANCE—Petrochemical Plants in France

Company	Location	Raw Materials	Products Fabricated	Destination
Atlantique Progil Electrochimie	Donges	Propylene (P) Benzene (C)	Cumene	Phenol & acetone
Progil Electrochimie	Port de Clair	Cumene	Phenol & acetone	Solvents, chlorinated phenols, synthetic tannins, phenoplastic resins
Rhone Poulenc	Peage de Roussillon	Propylene (P) Benezene (C)	Phenol & acetone	Solvents Nylon
Shell St. Gobain	Grand Couronne	C_{12} plus kerosine	Alkyl sulfate of soda	Detergents
Shell St. Gobain	Berre	Propylene (P)	Isopropanol and acetone	Solvents
Marles Kuhlmann	Chocques	Propylene (P)	Propylene oxide and derivatives	Polyester resins
Esso-Standard	Port Jerome	Propylene (P)	Tetrapropylene	Dodecylbenzene for synthetic detergents
Standard-Kuhlmann	L'Estaque	Benzene (C) Tetrapropylene	Dodecylbenzene	Detergents
SICA	La Chambre	Isopropanol (P)	Diacetone alcohol, methyl isobutylkentones methyl ethylketone	Solvents
Naphtachimie	Lavera	Heavy gasoline or kerosine (P)	Ethylene oxide, isopropanol, and acetone	Antigel, solvents, polyesters, resins

P—from petroleum
C—from coal

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FRANCE ***(continued)***

record in recent years follows:

	Thousands of Tons Per Year Capacity	Crude Runs	Operating Rate (Per Cent)
1958	33,685	30,000 (est.)	89
1957	33,485	24,965	75
1956	31,085	25,086	84
1955	30,435	25,086	82

Recognizing the growing need for heavy fuels in the Rhine region, with its dense population and concentration of heavy industry, the French government has approved the erection of two refineries in the Strasbourg area. As a result, Strasbourg eventually will become one of Europe's largest inland oil centers. The refining structures both of France and of western Europe will be modified by the proposed new plants and the similarly located Rhine River plants in western Germany.

The 100% French Cie, Française des Pétroles-Antar has begun work on a 70,000-80,000 b/d refinery which will be ready for operations in 1961. A Shell Bèrre-Caltex combine plans a 60,000 b/d refinery to go onstream in 1962. Both refineries will rely on oil from North Africa for raw material. Supplementing the proposed Strasbourg refineries, L'Omnium Française de Pétroles expects to erect a 60,000 b/d refinery at Chalon-sur-Saône by 1961. Plans will envisage future expansion of this plant to 100,000 b/d. In the Marseilles area, Ste. Française des Pétroles BP commissioned a new 40,000 b/d crude unit at Lavera in 1958, bringing plant capacity to 104,000 b/d and making it one of the largest in France.

Esso Rep is completing a new refinery at Ambès in the vicinity of Bordeaux. The new plant will have a capacity of 31,500 b/d. It is to be equipped with a Powerformer for high-octane motor-fuel production. Completion is scheduled for March 1959. The plant will process Parentis crude, which will be delivered by pipeline.

Aside from the work by Esso and BP, most of the construction at French refineries in 1958 was centered on special units. One such was the new desulfurization unit which went onstream at the La Mède refinery of Cie. Française de Raffinage, the nation's largest plant.

The first plant in France for the manufacture of synthetic rubber is to be built at Bèrre, near Marseilles. Three companies will be concerned in this development: Shell St. Gobain (in which the Royal Dutch-Shell group has a 60% interest), Michelin, and Cabot-Texas Butadiene. The new plant, which will have a capacity of 50,000 tons a year, is to be situated in the vicinity of the Shell Bèrre refinery, the St. Gobain chemical plant, and the Cabot carbon-black plant, from which sources it will draw its raw material. Production is expected to begin in 1961.

There are now 10 petrochemical plants in France producing a variety of chemicals for use by manufacturers of detergents, solvents, resins, and fibers. A list of these plants is shown in an accompanying table.

METROPOLITAN FRANCE—Crude-Oil Production, 1958

	(Barrels Per Day)		
January	27,000	July	27,700
February	26,300	August	28,100
March	27,300	September	28,100e
April	27,700	October	28,100e
May	27,900	November	28,200e
June	27,700	December	28,200e
	Year (1958) 27,912 b/d		

e—Estimated

OIL LAWS*

Controlling Statutes:* Principal governing legislation is the Mining Code of August 16, 1956, known as Decree 56-838. There are a number of subsequent modifying decrees; copies of all of them are kept on file.

*FRANCE—PETROLEUM LAW SUMMARY**

EXPLORATION: Duration: Explr. "permit," 5 yrs., extendible twice for max. 15 yrs. **Area:** Reduced 50% on 1st extension, 25% on 2d, for final 37.5% of original permit. No max. per concession. **Ownership:** French companies only. Permit granted at govt. discretion—with recent policy to exclude foreigners who "do not offer a substantial participation to French public or private capital." **Transfer:** At govt. discretion. If authorized, new holder must be sold geological and geophysical data. **Fiscal:** Applicant committed to exploration expenditure negotiated between govt. and concessionaire. Min. annual expenditure varies between 35 and 55 US cents per acre; renewals conditioned on min. expenditure. No taxes during exploration. **Drilling Obligation:** Not stated. **Conversion to Exploitation:** Exploitation concession obligatory upon commercial oil discovery, i.e., when cumulative production exceeds 2.1 million barrels.

EXPLOITATION: Duration: Max. 50 yrs. **Area:** May not exceed previous explr. permit. Max. number concns. per concessionaire, unlimited. **Ownership:** French companies (see above). **Fiscal:** Expenditures and other obligations negotiated in each case between govt. and concessionaire. **Royalty:** Progressive, 6% on crude production from 1,000-2,000 b/d, to 14% on 20,000 b/d and over. May be modified should new taxes "increase concessionaire's financial charges." On natural gas royalty is 5% of sales over 300 million cubic feet per year—nothing below that level. Additional royalties of 2¢ per bbl of crude and 0.3¢ per mcf of gas production for French administrative departments. **Income Tax:** Averages 45.6% —with upstream dividend tax of 18% on 75% of income after payment of income tax. US-French convention obviates double taxation.

Source: World Petroleum Legislation Report.

*Copies and translations of these laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y. (see p. 22 herein)

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NATIONAL FACTORS

The political situation has stabilized for the first time in many years with the accession of De Gaulle. The government's attitude toward investment by international companies is described in *WPR—1957*. It may be summed up by stating it involves a high degree of control, and a majority French ownership.

Income tax is high (see oil law summary); and so are internal operating costs. Due mostly to taxes, the cpst of a geophysical party is the highest in Europe. END

FINLAND

PHYSICAL DEVELOPMENT

EXPLORATION, PRODUCTION: There is no exploration known to be under way, and there is no domestic oil production.

REFINING, MARKETING: There is one refinery, a very modern 18,500 b/d plant designed by The Lummus Co. to operate on a mixture of Middle East and Russian crude. It is owned by Neste Oy, a government company, and is located at Naantali.

Phillips Petroleum Co. will build a 28,000-tons-a-year (560 b/d) plant jointly with Continental Carbon. The first plant was set up by Godfrey L. Cabot in late 1957.

Gulf and Shell will be forced to cut their deliveries of oil some 3 1/3 million barrels during 1959 and 1960. Shipments will be displaced by Russian oil so Finland will be able to reduce her ruble holdings. Finland imported 430,911 metric tons (about 8,600 b/d) of crude oil in the first half of 1958, of which 224,516 tons came from Russia and 206,395 tons from Iran, according to consular reports.

FINLAND—Imports
(Thousands of Barrels)

	1957	1956
Gasoline	2,970	3,023
Kerosine	435	561
Fuel oils	10,106	6,357
Lubricating oil	201	189
Total	13,712	10,130

Source: Foreign Trade, Jan.-Dec. 1957, Helsinki, through US State Department.

OIL LAWS*

The constitution of Finland contains no provisions concerning mining rights, which are governed by legislation. The controlling statute which regulates all phases of mining rights is The Mining Law of 1943 (March 24, 1943, No. 273 of 1943). This law has been supplemented by decrees of the Council of Ministers and by subsequent resolutions, which are usually included with The Mining Law of 1943 in *Kaivoslainsaadanto*, the handbook of mining published by the Finnish government. There is no special oil law. END

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

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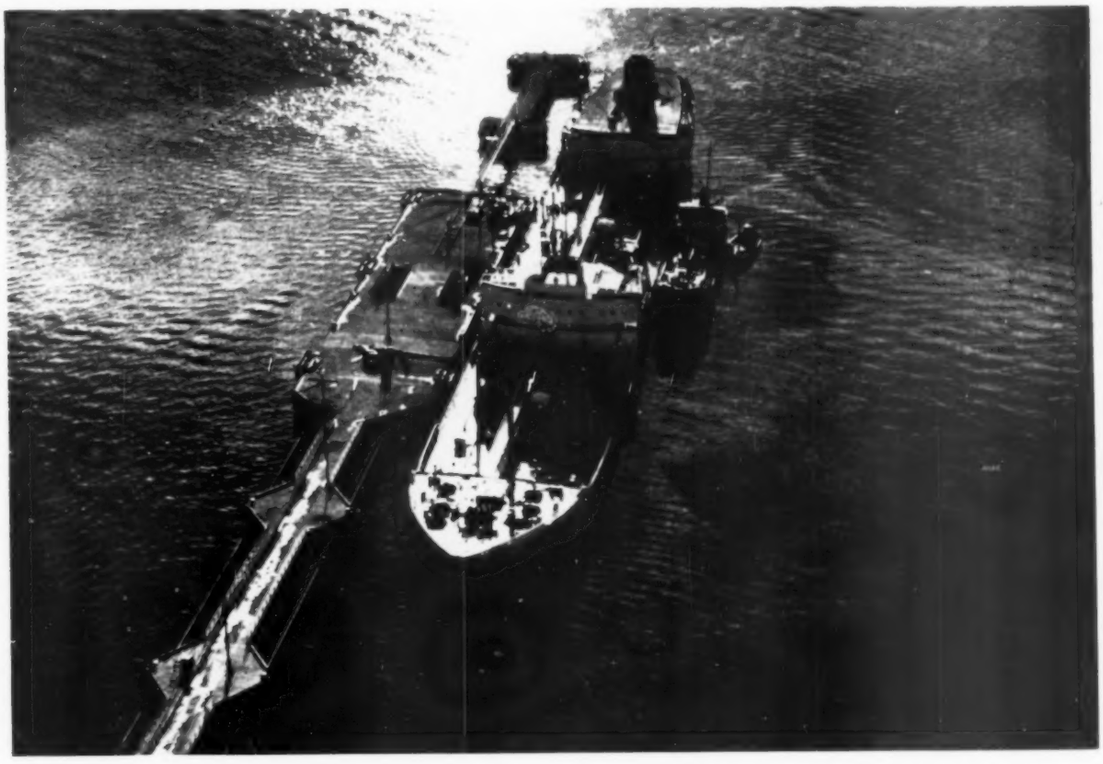

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GERMANY (WEST)

PHYSICAL DEVELOPMENT

EXPLORATION: Until recently it was believed that, after 20 years of intensive exploration, new prolific discoveries could be looked for only in deeper geological strata, specifically the pre-Salinarian in northwestern Germany. Drilling during the first half of 1958, however, indicated promising discoveries may still be looked for in the shallower formations which up to now have supplied the bulk of the crude.

Geophysical and drilling activities have been maintained at a high level. In the first half of 1958, producing companies drilled a total of 1,213,143 ft of deep hole, a decline of only 16,000 ft from the same period in 1957—due entirely to drilling of producing wells in proved fields. In the same 1958 period, wildcat and extension-well drilling was higher than in 1957. Exploratory wells rose to 45.9% of total drilling, 44.9% in 1957.

New oil finds in 1958 were primarily in the Weser-Ems district—with one new discovery at the end of July in Hanover oil province. On the eastern margin of the Gifhorn syncline, exploratory well Knesebeck-Dogger 2, drilled by Preussag for the Elwerath-Preussag consortium, encountered two well-impregnated oil sandstones of the Dogger beta (Jurassic) at depths of 4,354 ft to 4,393 ft and of 4,426 ft to 4,449 ft. A flow of about 25 cubic meters daily (157 bbl) of light oil through a ⅛-in. choke was made on production test. The Knesebeck structure, broken by faults into separate blocks, was located by preliminary seismic surveys. The discovery is approximately 2.5 miles east of the Vorhop-Nord oil field, not far from the Soviet-dominated zone.

Noteworthy extensions in Hanover were in the old producing districts of Haenigsen, Moelme, and Broistedt. Haenigsen had a comeback with a new prolific block encountered by Mobil Oil AG. Increased output since last May has been about 15,000 bbl monthly.

At Moelme, near Brunswick, oil was encountered in discovery well Wachtel 153, between 3,962 ft and 3,979 ft. The well flowed about seven cubic meters (44 bbl) of light oil per day. Later wells encountered gas, or a gas-oil mixture, in a higher structure.

Deviated extension well Broistedt 37c of Preussag-Elwerath encountered oil-bearing Wealden sandstone. Pumping tests between 3,224 ft and 3,283 ft yielded 27 to 29 cubic meters per day (170 bbl to 183 bbl) of crude with a specific gravity of 0.895. July 1958 output of Broistedt was 712 tons, against 251 tons in July 1957. Moelme output was 625 tons in July 1958, against 124 tons in July 1957.

A promising find was made last June east of the Ems River in wildcat Wettrup 2 of Elwerath-DEA-Itag-Preussag-Wintershall. Situated about five miles northeast of the Lingen oil field, crude output on the pump was approximately eight cubic meters (50 bbl) daily from about 3,300 ft.

About 0.5 mile southwest of discovery well Wettrup 2, exploratory well Lingen-Bramhar 2 struck oil in the Bentheim sandstone, 128 ft thick, on the Schachtbau-Elwerath-Mobil Oil concession. On production test, the well flowed 1.5 cubic meters (9.5 bbl) per hour of crude through a ⅛-in. choke. Specific gravity was 0.88.

At Wehrbleck, eastern Weser-Ems, a second Gewerkschaft-Elwerath-Mobil Oil well opened a new oil-bearing horizon in Wehrbleck 2, in a Kimmeridge sandstone between 3,456 ft and 3,469 ft. Initial daily flow was 13 cubic meters (82 bbl) of crude through a ⅛-in. choke.

August saw a noteworthy extension of the Hebelermeer field in the Emsland district. Hebelermeer 9 encountered considerable oil-bearing Bentheim sandstone (Valendis) between 4,144 ft and 4,328 ft. Flow was approximately 25 cubic meters (158 bbl) daily of light crude through a ⅛-in. choke. Gas-oil ratio was 29:1.

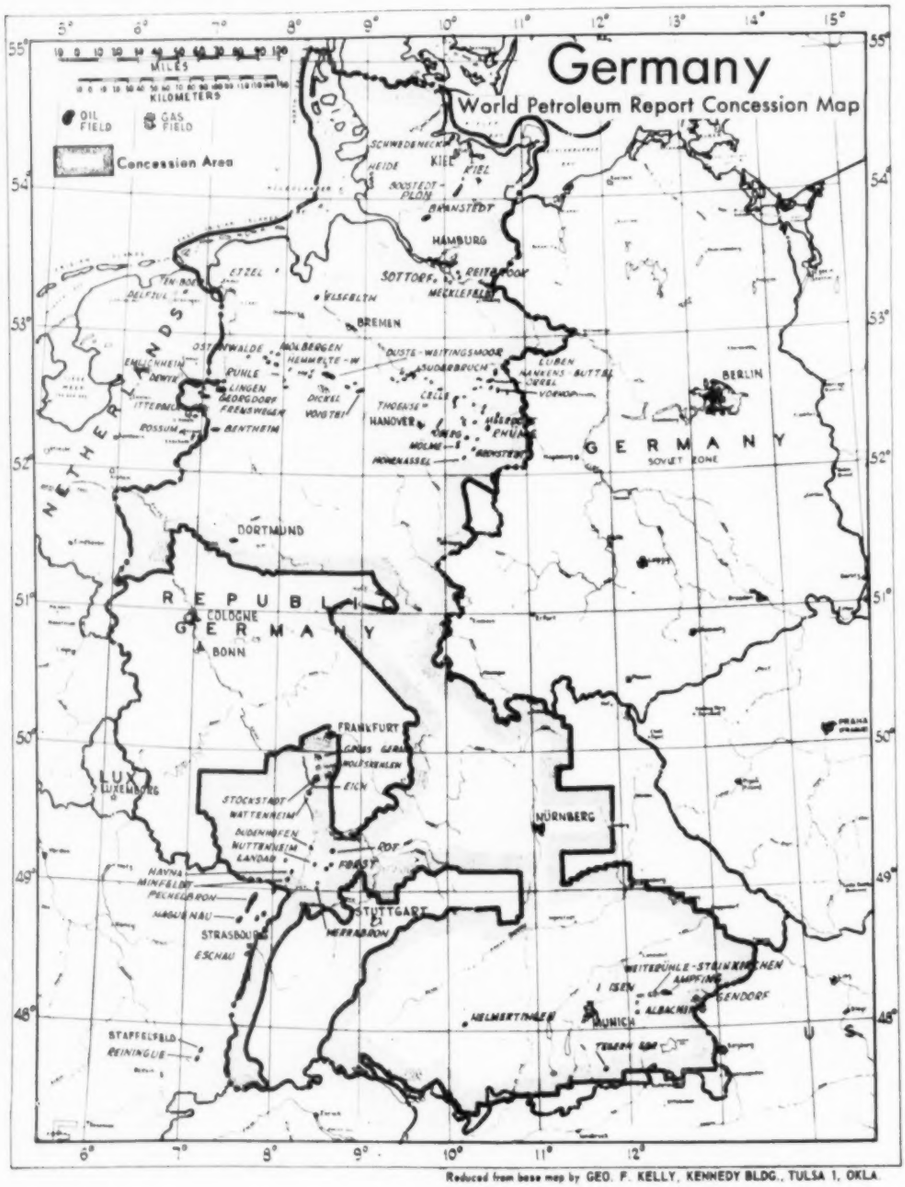
Natural gas was found in March in the main dolomite of the Zechstein between 8,957 ft and 9,088 ft in wildcat Kalle 1 of Deilmann-Elwerath-Preussag-Wintershall near the Dutch border. Production tests yielded a commercial gas.

In the Upper Rhine Valley, Deutsche Erdoel AG discovered oil in two horizons at Offenbach. Discovery Offenbach 1 encountered oil-impregnated sands of the Cyrena marl (Tertiary) between 3,523 ft and 3,536 ft. Initial output on the pump was four to five tons daily of paraffin crude; specific gravity was 0.843. Offenbach 3 averaged 14 tons daily of crude through a ½-in. choke from a depth of 3,346 ft to 3,412 ft. Further wells will indicate the size of the new deposit.

A new search for oil in the Alpine Foreland was sparked by some promising drilling results during the first half of 1958. Oil was discovered in March—in wildcat Moenchsrot 2 of Wintershall-Elwerath, about eight miles west of Memmingen town. This well produced the first commercial oil in the province of Wuertemberg. Moenchsrot 2 struck oil-impregnated sands between 4,852 ft and 4,849 ft and between 4,834 ft and 4,811 ft. The well later became a pumper. In July 1958, Moenchsrot produced 710 tons of crude.

Two new discoveries were made east of Munich. At the beginning of March, wildcat Muehldorf-Sued 1 struck oil at approximately 5,900 ft in the lower section of the Ampfing beds (Lattorf). The well belongs to Elwerath-Mobil Oil-Preussag. Initial yield was approximately

(Continued)



Reduced from base map by GEO. F. KELLY, KENNEDY BLDG., TULSA 1, OKLA.

GERMANY *(continued)*

20 cubic meters (126 bbl) per day of crude through a 1/8-in. choke from between 5,907 ft and 5,922 ft. In July 1958, Muehldorf-Sued produced 336 tons of crude.

Natural gas was discovered by exploratory well Moosach 1 of Mobil Oil-BMI-Preussag-Elwerath, approximately 12 miles southeast of Munich, between 9,438 ft and 9,571 ft. A flow test yielded 1,900 standard cubic meters of gas and 100 liters of condensate per hour through a 1/8-in. choke.

Exploratory well Murnau 1 of Preussag found promising oil and gas traces for the first time in the folded zone of sub-Alpine Molasse, extending in a narrow strip in front of the Alps, at a depth of approximately 9,200 ft. The specific gravity of the paraffin crude was very low. Production tests thus far have been hindered for technical reasons. Murnau is located about 15 miles north of Garmisch-Partenkirchen.

Efforts of German oil companies in foreign countries have been extended, but without much success thus far. Primary aim of the German companies in foreign countries is to secure their future share in the home oil market. Consumption, which is rising rapidly, may diminish if the firms continue to base their production on indigenous sources only.

PRODUCTION: Crude prodution in western Germany in 1958 was 85,772 b/d, probably will reach 100,000 b/d in 1959 or 1960.

West Germany's natural-gas production declined slightly during the first half of 1958 because customers under contract took less gas. Dry-gas production amounted to about 176 million cubic meters in the first half of 1958, 12 million less than in the comparable 1957 period. Decline was in the Emsland and Weser-Ems district only. Gas production was maintained at about the previous level in the Upper Rhine; while in Bavaria output was stepped up somewhat in the Isen and Ampfing fields.

GERMANY (WEST)—Crude-Oil Production, 1958

	(Barrels Per Day)		
January	79,000	July	87,100
February	81,416	August	87,600
March	82,100	September	85,000
April	84,000	October	89,055
May	85,600	November	89,893
June	86,700	December	91,800

Year (1958) 86,201 b/d

Source: German Oil Information Service, Hamburg.

Reserves: At the beginning of 1958, proved reserves were at about 53.4 million metric tons (approximately 379.1 million barrels) according to the German Geological Survey (Amt fuer Bodenforschung) and oil-company geologists—2.4 million tons higher than the year previous. If the 1957 production of 3.9 million tons is subtracted, actual increase is 6.3 million tons.

WEST GERMANY—Oil Reserves†
(As of Jan. 1, 1958—Tons*)

	Proved	Probable	Total
Holstein	3,382,000	1,140,000	4,522,000
Hanover	20,223,000	4,491,000	24,714,000
Weser-Ems District	11,207,000	4,270,000	15,477,000
Emsland	16,620,000	4,200,000	20,820,000
Upper Rhine Valley	1,683,000	1,005,000	2,688,000
Alpine Foreland	280,000	285,000	565,000
Total	53,395,000	15,391,000	68,786,000

*One metric ton equals 7.1 bbl. †Estimated.

According to the Assn. of German Crude Producers (Wirtschaftsverband Erdoelgewinnung), oil production, at 4.2 million tons in 1958, should reach 4.4 million in 1959, and 4.5 million in 1960. This appears conservative, as actual output in the first half of 1958 was 2,122,366 metric tons.

GERMANY—REFINERIES

Note: **This table indicates only changes or additions to refineries shown in *WPR 1958*, p. 188.**

	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
		(Barrels Per Day)		
BP Benzin und Petroleum AG (British Petroleum Co. Ltd.)	Hamburg-Finkenwerder[1]	40,000	SCA	4,500 T
Deutsche Erdoel AG	Heide[2]	15,000	Comp.	7,000 C
	Wietze	1,000	S	—
	Hamburg-Grasbrook[3]	1,600	L	—
Deutsche Shell AG	Hamburg-Harburg	15,000	Comp.	2,300 C
	Monheim-Keisholz	5,000	SAL	—
Esso AG	Hamburg-Harburg[4]	53,000	Comp.	11,500 C
Gewerkschaft Deurag-Nerag	Misburg near Hanover	17,000	Comp.	5,500 T
Gewerkschaft Erdoel-Raffinerie Emsland	Lingen in Emsland	17,000	SC	18,000 C
Mineral-und Asphaltwerke AG (MAWAG)	Ostermoor on Kiel Canal	3,200	SA	
Mobil AG	Bremen-Oslebshausen[5]	16,000	Comp.	8,000 C
Oelwerke Julius Schindler GmbH	Hamburg-Neuhof	4,700	SLA	—
Ruhrchemie AG	Oberhausen-Holten[6]	8,000	SC	5,500 TC
Wintershall AG	Salzbergen in Emsland	2,100	SL	—

Note: Key to type of plant appears in *WPR 1958*, p. 188.

[1] 5,300 b/d catalytic reforming; 3,200 b/d thermal reforming; 6,000 b/d Hydrofiner. [2] 4,000 b/d catalytic reforming; 2,500 b/d cat-poly.; 2,500 b/d topping unit; 8,000 b/d hydrotreating; 20-ton-per-day Claus unit. [3] Half-finished charging capacity. [4] 6,500 cat-reforming. (Esso is building 160,000 b/d refinery at Cologne.) [5] 3,700 b/d cat-reforming; 5,000 hydrodesulfurizer; crude capacity to be raised to 30,000 b/d. [6] 1,800 b/d cat-reforming.

As production is increasing daily, it is likely that 1958 output will have reached 4.4 million tons (about 85,890 b/d).

An estimate of the Geological Survey indicates the main suppliers of indigenous crude are the horizons of the Cretaceous, mainly the Wealden and the Valendis. At least 46.5% of Germany's total output came from the Cretaceous in 1957. The Jurassic, primarily the Dogger, ranks second with 46%; Tertiary 3.9%; Triassic (Keuper) 2.9%; and Permian (Zechstein) 0.7%.

REFINING AND MARKETING: Changes or additions to German refineries as set out in *World Petroleum Report—1958* are shown in the accompanying table.

With domestic demand rising sharply—especially in fuel oil for the republic's industrialization—West Germany is in the midst of a gigantic refinery, petrochemical, and pipeline building program (see *WPR 1958*). Present refinery capacity is about 415,000 b/d with over 70% of the crude imported from the Mideast and Venezuela. The West German Assn. of Crude Oil Producers & Processing Industries expects refinery capacity to increase to 850,000 b/d by beginning 1962. The oil industry now is estimating crude demand at 680,000 b/d by 1965, double the present level—with crude imports quadrupling.

Largest refinery expansion will be in the Ruhr-Rhine area, where BP, Shell, Esso, Petrofina, and others are currently engaged in a construction program which ultimately should add a combined 266,000 b/d to potential Ruhr-Rhine capacity. This refinery complex will mainly be linked with the 230-mile Cologne-Wilhelmshaven pipeline network soon to be completed. Port facilities at the North Sea port envision simultaneous handling of four 110,000 dwt tankers and two 47,000-tonners. With completion of her building program, Germany's dependence on imported refined products should lessen.

West Germany's total oil demand during 1958 was estimated at 335,000 b/d, a rise of about 19.5% over the previous year. The sharp rise followed ending of the Suez crisis in 1957. Consumption in the first half of the year was 36% greater than in the comparable 1957 period.

TRANSPORTATION: The country's only major crude-oil pipeline now connects the North Sea port of Wilhelmshaven with Cologne. The operating company, North-West Oil Pipeline Co., laid its 28-in. pipe on the 230-mile route, and the line began operation in late 1958 at 200,000 b/d, with one pumping station at Wilmhelmshaven. Three additional pumping stations will boost capacity to 440,000 b/d later. The line is remote-controlled from Wilhelmshaven. Ownership is Esso, 47.2%; BP, 26.3%; Petrofina, 8.3%. Three German companies hold the remainder.

A 500-mile 10- and 12-in. military pipeline, now completed, will begin operation in the spring from St. Nazaire on French Atlantic coast to south of Heidelberg, Germany, east of the Rhine.

Other than this line, all existing German oil pipelines are of only local importance, none of them longer than 19 miles. For a tabulation† of same, see *World Petroleum Report—1958*.

†Review compiled by the law firm of Dr. W. v. Metzler and Dr. Kurt Abendroth, Alter Wall 32[III], Hamburg 11, Germany.

OIL LAWS*

Under the constitution, the German states may decree laws as long as the federation has not exercised its right for legislation. Since the federation so far has not decreed laws in this sphere, the states may exercise their right for legislation. The respective laws on the introduction of the state prerogative for the exploration and exploitation of petroleum decrees by the federal states of the former German Reich—the borders of which, by the way, do not coincide with today's federal states of the West German Federal Republic—are the following: Lubeck, Law of March 21, 1904; Schaumburg-Lippe, Law of March 28, 1906; Bremen, Law of July 15, 1906; Oldenburg, Law of August 3, 1908; Bavaria, Law of August 13, 1910-August 17, 1918; Hamburg, Law of July 3, 1911; Brunswick, Law of June 13, 1917; Württemberg, Law of March 29, 1918; Badenia, Law of April 17, 1918; Hessia, Law of August 26, 1922-March 26, 1927; Lippe, Law of July 4, 1927.

The above acts are still in force today notwithstanding the changes which have taken place since 1945 concerning the borders of the federal states. Particularly the Prussian Petroleum Act of December 13, 1934, applies within the border of the former Prussian state, i.e., the following states of the West German Federal Republic: Schleswig-Holstein, Lübeck, the borders of the former Prussian state, i.e., in Lower Saxony, Hessia, North Rhine-Westphalia, and Rhineland-Palatine, as well as in parts of the former federal states of Brunswick and Hessia. Apart from these territories of the former federal state of Prussia, the Petroleum Act is also applicable in Hamburg, Bremen, and in the Saarland. The Chief Mining Board of Clausthal-Zellerfeld controlled, in 1953, 98.3%

(Continued)

GERMANY *(continued)*

of the entire petroleum production of the West German Federal Republic. Therefore, the Prussian Petroleum Act of December 13, 1934, is of particular importance.

Legal regulation in those territories of the West German Federal Republic not covered by the Prussian Petroleum Act are very similar, and differences are minor.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

Apart from the political situation, especially the proximity of Soviet influence and armed forces, the investment climate is generally good.

Exchange regulation has many of its origins in Germany, and restrictions exist for many countries but not for the United States, Venezuela, Canada, or others specified. These countries are in an "area of freely convertible currencies," and incoming payments may be received in their currencies, such as US dollars, and payments due these countries may be made in any foreign currency.

The par value of the Deutsche Mark is 4.20 per US $1.00. Official market rates are maintained within limits of 1% of this rate (for complete description of this system, see Ninth Annual Report Exchange Restrictions, International Monetary Fund).

WEST GERMANY—OIL LAW SUMMARY‡

The various states of Germany have separate pertoleum laws, but all are similar to the Prussian Petroleum Act of December 13, 1934, as summarized here. All subsoil rights are reserved to state following passage of act; previous concessions still pay royalty interests to private parties.

RECONNAISSANCE: Preliminary permit for geological and geophysical work grantable. Separate permit necessary for drilling. No taxes or fees specified.

EXPLORATION: Granted subsequent to reconnaissance permit. **Duration:** 5 years. **Maximum Size:** 500 sq. km. **Drilling:** Obligation may be contained. **Fee:** $238 payable on signature. **Transfer:** Subject to government approval. Must compensate real-estate owners for loss of usufruct and damage.

EXPLOITATION: Guaranteed to holder of exploration area. **Area:** Split into lots extending up to 4.4 km around drilling well. **Duration:** 30 years. **Work Obligation:** Must begin development within "reasonable period"; thereafter continue with "diligence." **Surrender:** Any time. **Royalty:** 5%. **Expiration:** Operating equipment passes to state. **Transfer:** Only with government approval. Transferee must prove financial qualifications equivalent to cost of three deep wells, generally speaking. **Income Tax:** 45% on net profit of corporations. Company foundation tax, 3% of capital paid in. Property tax, 1% of value of property. END

‡Review by law Firm of W. v. Metzler and Dr. Kurt Abendroth, Alter Wall 32[III], Hamburg, Germany. Copies of laws cited, including English translation of Prussian Petroleum Act, kept on file at offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y.

GREECE

PHYSICAL DEVELOPMENT

EXPLORATION: Exploratory testing, begun in 1956, continued throughout 1957 and 1958 without encouraging results.

During 1958, C. Deilmann Bergbau GmbH, of Bentheim, Germany (in cooperation with Hellenic Sun Oil Field Exploration and Development SA) continued operating one rig in Greek Thrace. From February until May 1958, Deilmann drilled Tavri SW 4 (begun in 1957) in the northeastern part of Tavri, on the same structural trend as wildcat Ardanion 1 abandoned dry in 1956. Tavri SW 4 penetrated the Eocene, with insignificant oil and gas shows. It was abandoned at 1,335.9 meters after having reached basement (Graywacke series, Mezozoic). Salt water flowed on open-hole tests through sandstone horizons of the Upper and Middle Eocene. The company planned no further operations for the balance of 1958.

During the year, significant geological information resulted from an evaluation of the 1957 drilling by two American concerns in the far southwestern part of Greece on the Island of Zante (see *World Petroleum Report 1958*, p. 174). On the southernmost Ionian island of Zante, in the swampy Keri Bay region, Israel Mediterranean Petroleum Inc. and Pan-Israel Oil Co. Inc. drilled seven shallow wells aggregating 7,000 ft of hole on their 120,000-acre concession between March and June of 1957. With no oil or gas shows, they surrendered the concession—returning the portable rig to Israel. Two perpendicular lines of holes drilled in the Keri area, with 650-ft spacing between the seven wells, indicated the Miocene, Eocene, and Upper Cretaceous had been tested. However, the extremely heavy oil found in erratic fracture zones proved the venture noncommercial because of excessive amounts of associated salt and sulfur water. Though oil shows were abundant, no new oil deposits were found. The final conclusion was that, although it is possible that once oil had accumulated in the Keri field, at the present stage there seems to remain only residual oil, whether the field has been depleted by previous production, seepage, or both.

PRODUCTION, REFINING, MARKETING: There is no production of crude oil.

There is only one refinery, a 27,000 b/d skimming plant near Athens. It went onstream at the end of 1958. It was built by the government and leased during 1958 to a group known as the Transport, Trading & Oil Refining Co. (see Oil Laws section).

Elbyn Lubricating Oil Refinery Ltd., a local company, has applied for permission to build a 6,000 b/d refinery at Piraeus. Approval by the Council of Industry has been received, but not by the Ministry of Industry.

Total value of imports in 1957 was 109,695,000 drachmae, equivalent to about $3,656,500 at the exchange rate of 30 per dollar.

OIL LAWS*

Recently, the government became interested in promoting exploration through passage of a new oil law as a result of a visit by D. R. Kingston, of Standard of New Jersey, who indicated there were possibilities of oil production in Greece if suitable legislation existed. (There was no oil law in Greece as of year-end 1958.)

World Petroleum Report Concession Map
GREECE (THRACE)
PETROLEUM CONCESSION RIGHTS HELD BY HELIOS, A LOCAL GREEK COMPANY.
REPRESENTS SEPARATE CONTRACT COVERING ABOUT 19,800 ACRES
REPRESENTS SEPARATE CONTRACT COVERING ABOUT 290,000 ACRES
BULGARIA
TURKEY
AEGEAN SEA
Alexandroupolis
Reduced from base map by GEO. F. KELLY

A draft law was prepared, which is summarized on p. 89 herein.

On August 8, 1958, a contract was signed between the government and Transport Trading and Oil Refinery Co., owned: 43% by Bodasakis Athanasiades, a Greek financier; 43% by Stavros S. Niarchos; 10% by Socony Mobil Oil Co., and 4% by Dimitrios A. Carapanos (Hydrocarbon Research Inc., of New York). The latter will operate the refinery. Socony will supply crude oil and export any products remaining after local demand has been satisfied.

Duration of the contract is 10 years, under $1 million guaranty. Payments to the government (which spent $25 million in constructing the plant) will be 90.5% of annual profits. The remaining 9.5% profit is subject to normal taxation. The government reserves the right to approve, modify, or reject refining programs as well as the right to supply crude up to 30% of capacity. There is also a minimum annual rent of $6 million.

Products of the refinery are to be sold at "international" prices. Technical management may be from other countries, but the number of nonnational employees must be reduced from 60 in the first year to no more than 10 in the fourth and following years. (The plant, which went into operation in October, employs about 450 persons, all told). In the event of oil discovery in Greece, the contract may be modified.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

The sum of factors involved makes the country not very attractive for international oil investment. The experience of previous USA explorers in Greece was not altogether a happy one; it is described as a country "hard to get into and hard to get out of." Income-tax rates are high, ranging up to 60% on income over $6,660. The oil law, at least in its present draft form, leaves much to be desired. Added to this is the discouraging result of exploration so far.

(*Continued*)

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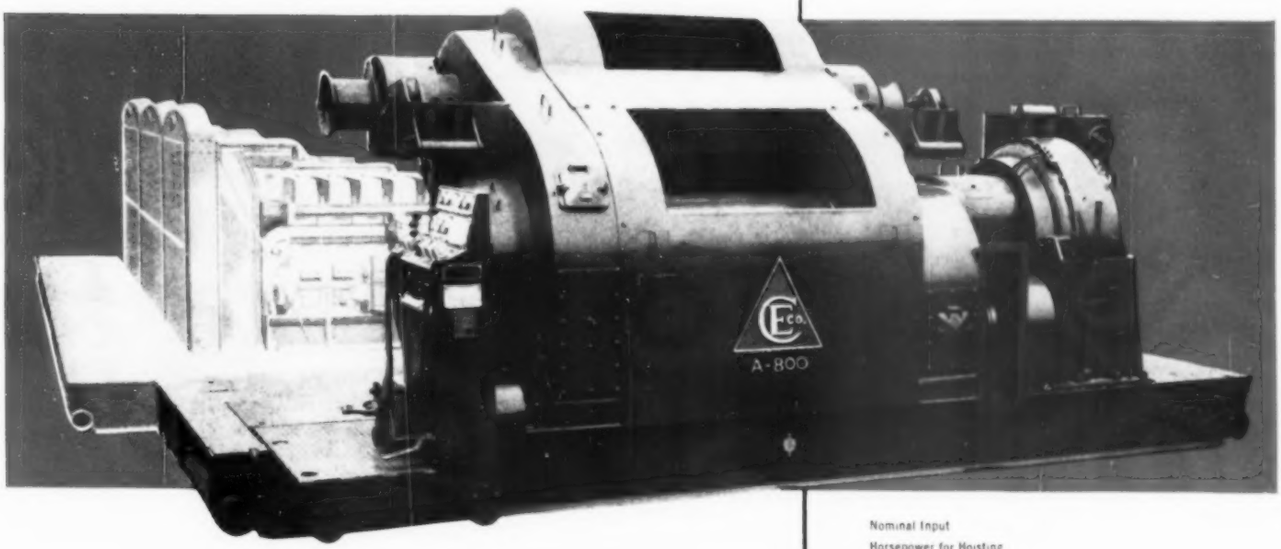

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Loading NITRAMON* S in the desert. NITRAMON S and its primers are packed in threaded metal cans that are virtually weatherproof. Charges are easily assembled and so rigid that they can often be loaded when gelatin dynamite can not.

IN EXPLORATION

NITRAMON* S—safest blasting agent known. Cannot be detonated by flame, sudden shock, ordinary blasting caps or even a .30 calibre rifle bullet. Yet it is readily detonated with NITRAMON Primer. Packed in rigid, watertight metal containers. Ideal for "sleeper" holes.

NITRAMON* WW—has properties similar to NITRAMON S, but is designed for offshore work. Watertight metal cans offer maximum storage and weather protection and fire resistance. Cans sink rapidly, but are easily buoyed up when necessary.

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*Du Pont's trademark for its polyester photographic film.

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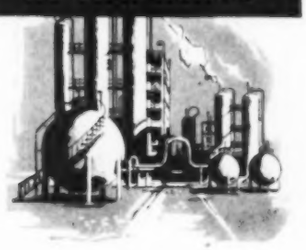
HIGH VISCOSITY CMC—developed especially for low-solids drilling muds, builds viscosity . . . provides good fluid-loss control and keeps mud costs down because of the minimal amounts needed to do the job.

LOW VISCOSITY CMC—minimizes fluid loss in drilling muds without adding excessive viscosity. In some cases, notably sea-water muds, it is used as a thinner to reduce mud viscosities and gels. It is also used extensively in lime-treated muds to avoid high mud viscosities often caused by starch.

DU PONT PLASTICS—Because ZYTEL* nylon resins have excellent bearing properties and abrasion resistance, they are now being used, for example, to manufacture sucker rod guides. ZYTEL prevents wear between rods and tubing in lifting fluid from a pumping well. TEFLON*—TFE fluorocarbon resins have a natural slippery surface; less torque is needed to turn shafts or stems equipped with packings made of TEFLON, even under high gland pressures.

DU PONT NEOPRENE SYNTHETIC RUBBER is widely used for rubber parts on drilling tools. Drill stabilizer bushings of neoprene operated successfully at 40,000 lbs. pressure in a 13,000' hole. Other examples of neoprene parts: drill pipe protectors, casing guards, packing rings, piston rubbers and pipe strippers. Du Pont neoprene resists deterioration from heat, drilling muds and abrasion and has served oil drillers for over 25 years.

IN REFINING



THE WORLD'S FIRST manufacturer of tetraethyl lead, Du Pont's Petroleum Chemicals Division has served the petroleum industry for 36 years; this division also offers highly effective antioxidants, dyes and additives for fuel and lube oils.

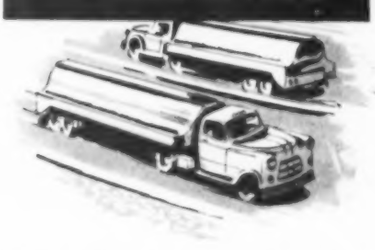
BOTH DU PONT NEOPRENE AND HYPALON* synthetic rubbers are used in various applications in the refining process. HYPALON hose has outstanding resistance to strong oxidizing chemicals. Neoprene gives remarkable service in transmission belting, as a protective jacket for wire and cable, for valve and pipe linings, tank linings and as a protective maintenance coating where corrosive atmospheres are encountered.

TEFLON RESINS have superior physical properties and withstand the most corrosive chemicals, even at elevated temperatures. For these reasons, it has gained widespread use in pipe linings, hose, gears, bearings, gaskets and packings.

WEED KILLERS—TELVAR monuron and KARMEX diuron kill unsightly weeds, reduce fire hazards and maintenance costs in refinery tank farm and pipeline properties. One application does the job for a season or longer.

DU PONT DULUX* TANK WHITE ENAMEL reduces evaporation losses of costly volatile liquids in atmospheric pressure storage. This evaporation, caused by heat, is minimized by the use of durable, high-reflective "Dulux" Tank White.

IN MARKETING



TIME HAS PROVED the exceptional durability of neoprene hose. Whether it's dock, curb pump, fuel oil or tank truck hose, performance records are convincing evidence of neoprene's extended service life. Neoprene tube resists deterioration from oil, gasoline or chemicals. Neoprene hose cover resists sunlight and weather, withstands rough handling that chips, cuts, abrades and causes flex cracking in ordinary hose.

DU PONT LUCITE* ACRYLIC RESINS are lightweight, durable, and have superior optical properties. These naturally lend themselves to the manufacture of signs, medallions and displays with eye-catching sales appeal for the retail outlet. *The corrosion resistance* and toughness of ZYTEL nylon resins make it ideal for bearing and valve parts in gasoline pumps. Moreover, its moldability often means fewer parts are required in an assembly, thereby improving operation and reducing costs.

ALATHON* POLYETHYLENE RESINS AND ZYTEL NYLON RESINS are used as insulating and jacketing materials for wire and cable because of their high dielectric strength and resistance to oils and chemicals.

**"Hypalon" is Du Pont's registered trademark for its synthetic rubber [Du Pont supplies only the neoprene and "Hypalon". It does not make the finished products described here. These are made by better rubber products manufacturers.]*

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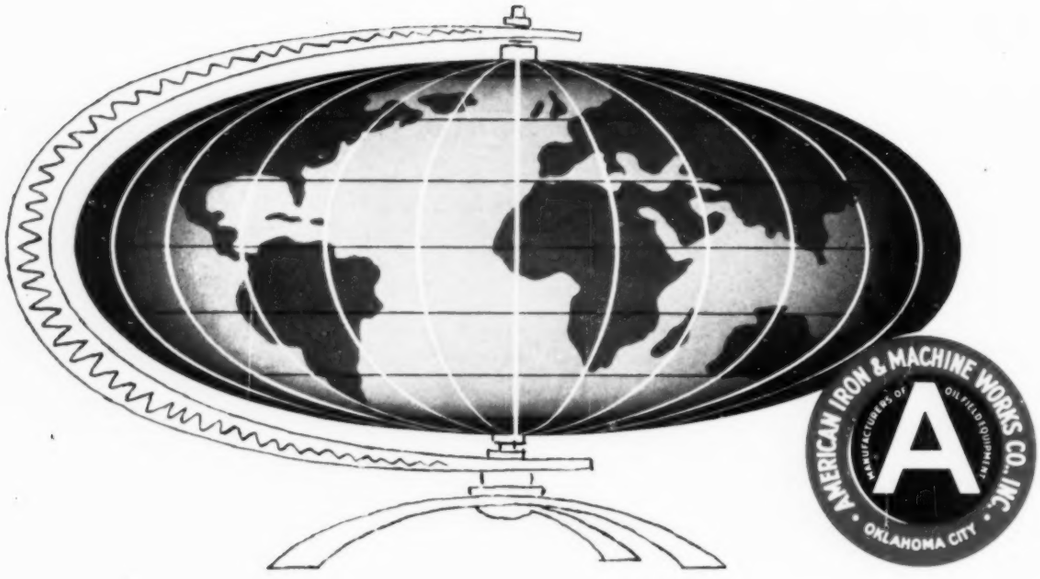

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For dependable rotation of your drilling string, American Iron Hex or square kellys are better balanced for smooth running at all drilling speeds.

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American Iron Releasing and Circulating Overshots are in worldwide use. The best hole insurance for your rig floor.

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Built for high pressure operation, with 3-inch seat for maximum fluid flow. Outlasts and outperforms all others.

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Hand-applied "Straight Grip" tool joints, with 4-point seal protection, are easily removed and installed at your rig.

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GREECE *(continued)*

GREECE—DRAFT OIL LAW SUMMARY*

Vests all **exploration** and **exploitation rights** (including offshore) with the State, which may exercise them for its own account or grant them to other parties under concession or contract agreements ratified by the parliament. The **lease period** is 30 years, and can be extended for another 10 years if regular production is established. The **area** under lease cannot exceed one million strèmmas (one acre equals 4.1 stremmas).

Agreements will be subject to **performance bonds** during a two-year exploration stage, which can be extended for two more years and then two more years for a total of six years, if required drilling is done. **Royalty** is scaled in accordance with yearly production, and ranges between 2% and 30%. **Foreign capital** brought in to implement agreements will enjoy the provisions of the 1953 Foreign Investment Law. **Taxes** and **fees** are not specified, and are to be determined by negotiation. END

ITALY

PHYSICAL DEVELOPMENT

EXPLORATION: AGIP Mineraria, the main operating company of Ente Nazionale Idrocarburi, Italy's State-owned petroleum company, had 11 geological parties working in 1958, mostly in northern Italy. SOMICEM, another ENI operating company, had eight geological parties active in central-southern Italy.

Geophysical work by ENI subsidiaries continued at about the same rate as in 1957. In the Po valley, particularly the delta region, AGIP had 13 crews working, and SOMICEM had seven.

In the first 10 months of 1958, only minor gas fields had been discovered in the north. In the Po valley, the ratio of dry holes to oil producing wells was growing. Out of 25 wildcats completed in 1957, 20 were dry holes—two insignificant, and three were gas producers.

In only one wildcat by SOMICEM outside the Po valley, Bonanno 1 in Abruzzi, were tangible results obtained. Noncommercial quantities of crude were found at 5,570 ft in Miocene limestone. A second test, Bonanno 2, was drilling in 1958.

In the south of Italy, Cities Service, through a subsidiary, began exploration in 1958. Pan American International Oil, an Indiana Standard affiliate, is operating the area jointly with Cities Service.

Sixty applications for offshore exploration had been made up to October 1958.

A geological survey in Sardinia was expected to lead to an early drilling program along the coast from Quartu S. Elena to Oristana in the Cixerri valley. Present prospecting is being carried out by the regional government and the West German firm of Wintershall AG.

PRODUCTION: Exact figures for the Italian mainland crude-oil production (excluding Sicily) are not readily obtainable because the official ENI data cover both regions. In 1958 production in both Italy and Sicily averaged 32,200 b/d. Natural-gasoline output in July 1958 was 38,000 tons, and natural gas came to 374 million cubic meters. In the first seven months of 1958, the total for natural gas was 2,196 million cubic meters, 3% over the same period the previous year. Sicilian fields supply a large part of the crude, and the Po valley a large part of the gas. A recent breakdown indicates that mainland production is about 2,900 b/d.

REFINING: Processing capacity on the mainland was some 604,000 b/d in 1958, with little expansion in sight soon. One new development late in 1958 was Getty Oil Co.'s acquisition of a 51% controlling interest in Soc. Golfo Industria Petrolifera, a refining company which owns a 30,000 b/d plant at Gaeta, near Naples.

Petrochemicals manufacture took most of the 1958 limelight in Italy. The huge synthetic-rubber and fertilizer plant of ANIC, an ENI subsidiary, at Ravenna, was dedicated in the spring of 1958 and scheduled for operation by year-end. Output will be 60,000 tons per year of GR-S type rubber and 750,000 tons per year of nitrogenous fertilizers, using Po valley natural gas as raw material.

Also in Ravenna, Soc. Cabot Italiana, an affiliate of Cabot Laboratories, of Boston, is building a $3 million 14,000-ton-per year carbon-black plant, for completion in two years.

At Scanzorosciate, near Bergamo, Italital SpA, Milano, will build a 2.2 million-pound-per year maleic-anhydride plant, the first in Italy. Scientific Design Co. Inc. and Ste. Française des Sérvices Techniques Sarl, Paris, will furnish process engineering and major equipment design.

In Ferrara, Montecatini is expanding its propylene and ethylene production facilities by about 70 million pounds per year, with completion planned for 1959. In another Montecatini expansion project, the Castellanza formaldehyde plant will be boosted by 55 million pounds per year.

In Mantua, Sic. Edison has under construction a petrochemical plant, to operate on feed stock from RASIOM Augusta refinery. It will include steam cracking of olefins, and production facilities for styrene, polystyrene, propylene, and tetramer.

TRANSPORTATION: The Italian ministry of public works had a number of pipeline projects under consideration during 1958, although no final action has been taken as yet. Among the projects were: (1) a 180-kilometer crude-oil line from Multedo, near Genoa, to Aigle, in Switzerland, eventually to Germany; this was approved by the government in 1959; (2) a crude line from Multedo to S. Giuliano Vecchio and to Locate Griulzi (both in the Po valley south of Milan), where inland crude storage will be located; (3) SIMSA's 300,000-cubic-meter-capacity crude-oil terminal and pipelines in the Multedo hinterland; and (4) a 210-mile crude line along a proposed railway from Venice to Munich, Germany, to carry Middle East crude from Venice, or Trieste, to Middle Europe. Still another project under consideration during 1958 was a Venice to Vienna, Austria, pipeline.

MARKETING: Italy's import-export and consumption situation is shown in an accompanying summary table. Overall consumption of oil products in the country has more than doubled since 1949. It was at a daily average of 226,000 bbl in 1957, and rose to 260,000 b/d (approx.) in 1958. Natural gas has gone up even faster. The 176 billion cubic feet used in 1957 was a twentyfold increase over 1949 consumption.

OIL LAWS*

Although regulations to the controversial 1957 Law have not yet been passed, the government's petroleum department is giving clarifications as needed, and companies are operating under 1957 provisions.

The outcome of the elections made extremely unlikely passage of the draft legislation providing for an eventual 50% reduction (over 12½ years) of the Po valley area, in which ENI has a monopoly. Even if it were passed, there is nothing to prevent companies associated with or controlled by ENI from taking up concessions on the surrendered areas. Private concessionaires who might come in would be subject to the 1957 law provisions because there are no separate exploration provisions in the Po valley draft law.

A bill was drawn up during early 1957, and presented to parliament by the government, governing exploration and development of hydrocarbons on the continental shelf, known as Law No. 6 of January 11, 1957. The provisions are outlined in *World Petroleum Report—1958.*

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N. Y. (see p. 22 herein).

ITALY—OIL LAW SUMMARY* (Revised September 15, 1958)

LEGAL AND FISCAL REGULATION OF THE PETROLEUM INDUSTRY: Within continental Italy, oil is governed by the Petroleum Law of 1957. Within the Po valley, operations are exclusively by Ente Nazionale Idrocarburi, by Law No. 36 of February 10, 1953.

EXPLORATION: Permits grantable only to Italians or to "companies registered in Italy." **Area:** Maximum per company is 300,000 hectares within the State or 150,000 in any one region. **Duration:** Three years initial. Two 2-year extensions grantable. **Operations:** Must begin drilling within 30 months. Must receive approval on drilling of each well. **Rentals:** 200 lire per hectare yearly of exploration permit area. On first extension, increases to 400 lire, and to 600 lire on second extension. **Surrender:** On expiration of first term of permit, 25% must be surrendered; 25% on expiration of first extension.

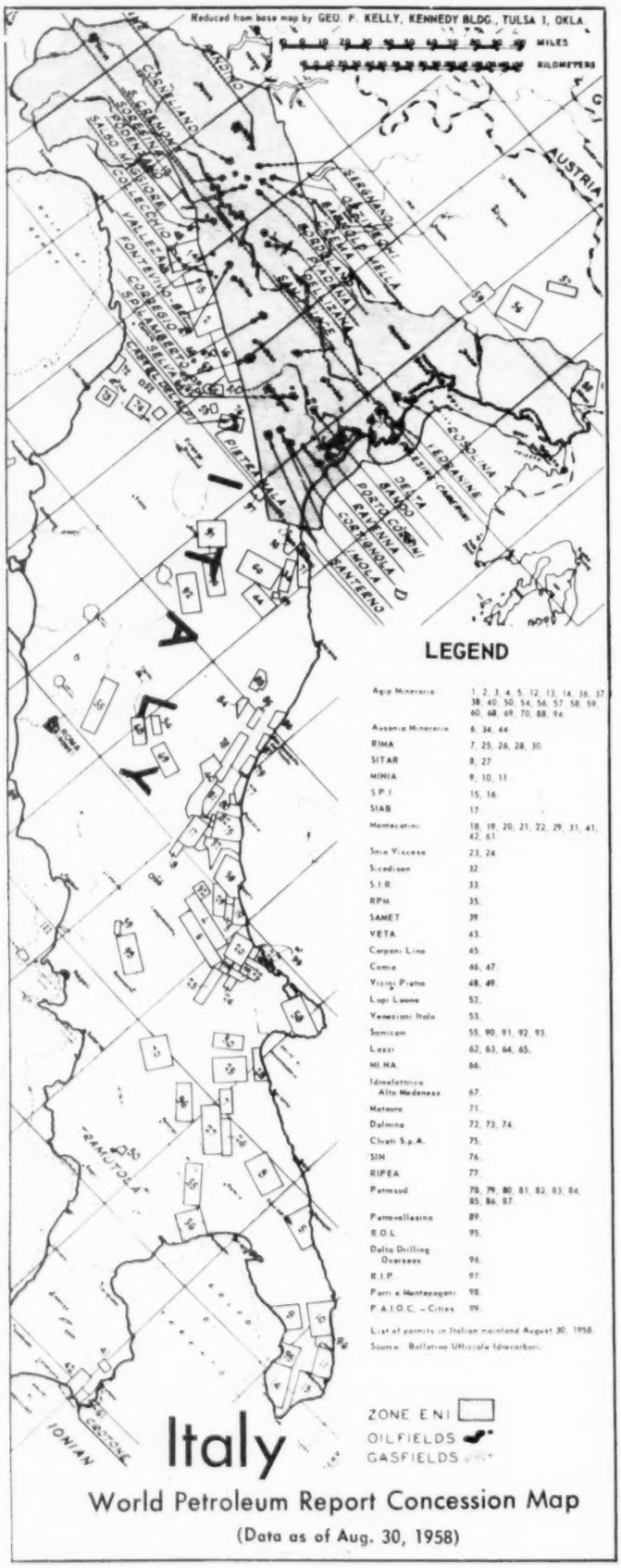
EXPLOITATION: Conversion guaranteed when hydrocarbons in commercial quantities are discovered. **Area:** Maximum to one company is 80,000 hectares. One-kilometer belt around concession set aside for State. **Auctions:** Areas going to State disposed of at public auction (Art. 29). Ente Nazionale Idrocarburi may not participate. Minimum bids will be five million lire. **Duration:** 20 years. Right to one 10-year extension. **Surface Tax:** 1,500 lire yearly each hectare. **Royalty:** On the average daily production per well, rises to 22% maximum. Natural gas is same. **Participation by ENI:** ENI may explore outside Po valley, and may use services of specialized firms but may not pay them with share in the net or gross production. ENI is not subject to the maximum areas for exploration or exploitation. **Regulatory Authority:** The National Mining Office for Hydrocarbons, which is under the Ministry for Industry and Trade, Directorate General of Mines.

NATIONAL FACTORS

There has been considerable criticism recently of ENI's activities outside of Italy. ENI now has interests in Egypt, Iran, and Morocco, and is actively looking for concessions in other areas, including the Yemen, India, and Libya. Plans are also afoot to operate with Pan Ameri-

(*Continued*)

NEED OIL LAWS? CONCESSION TEXTS?
All the World's oil laws and concessions are kept on file, *in English translation*, by us. See World Petroleum Legislation Report, page 22 this volume.



ITALY — Inland Consumption of Oil Products

(Thousand Metric Tons)

	1950	1955	1956	1957	1958 (c)
Gasoline (a)	670	1,340	1,495	1,600	1,765
Kerosine	185	173	165	154 (b)	151
Turbine Fuel	—	93	100	125	150
Gas/Diesel Oils:					
Automotive	537	1,070	1,171	1,280	1,450
Agricultural	108	350	402	415	440
Other	80	150	159	170	170
Fuel Oil	2,300	5,200	6,400	6,835	7,500
	3,880	8,376	9,892	10,579	11,626
Lubricants	120	183	192	202	
Liquid Gas	35	335	400	450	
Bitumen	150	333	390	380	
Total	4,185	9,227	10,874	11,611	

(a) Including aviation gasoline (40,000 tons in 1957), also motor gasoline sold at reduced prices to foreign tourists (92,000 tons in 1957). No change in aviation gasoline assumed for 1958.

(b) Of which 120,000 tons vaporizing oil and 34,000 tons burning oil.

(c) Sales during early months and forecasts for remainder of the year. Turbine fuel figure from Ministry of Industry.

Source: Unione Petrolifera, via Petroleum Press Service.

ITALY — Operating Refineries

Name of Company	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
Anonima Petroli Italiana	Falconara [1]	26,000	S	8,000T
A.B.C.D.	Ragusa, Sicily	100	A	—
AGIP—Mineraria	Cortemaggiore	2,965	SC	2,225C
Aquila	Trieste	26,000	Comp.	6,300C
Bianchi Petroli	Cologno Monzese	1,500	S	—
Condor	Rho [2]	45,000	SC	15,000C
Delle Piane	Genoa	1,000	S	—
D.I.C.A.	Carrara	8,800	S	—
Garrone	Genoa [3]	29,000	S	—
Golfo	Gaeta [4]	30,000	S	—
I.R.O.M.	Marghera, Venice [5]	35,000	Comp.	—
IPLOM	Busalla, Genoa	4,000	S	—
I.C.I.P.	Mantua [6]	12,000	SC	2,340C
I.L.S.E.A.	Valmadrera, Como [7]	2,700	S	—
Italia	Cremona	25,000	S	—
INPET-Shei	La Spezia [8]	35,000	SLA	—
NILO	Milan [9]	10,000	S	—
Lombarda Petrol	Villasante, Milan	5,500	S	—
Purfina Italiana	Genoa [10]	11,000	Comp.	1,500C
	Milan [11]	7,000	SLA	—
	Rome [12]	11,000	Comp.	1,500C
Petroli d' Italia	Fiorenzuola d'Arda, Parma	4,000	SC	1,000T
RASIOM	Augusta, Sicily [13]	95,000	S	—
R.O.L.	Viguzzolo, Alessandria	1,400	SL	—
Mobil	Naples [14]	65,000	Comp.	13,500C
Sanquirico	Genoa	4,000	S	—
SAROM	Ravenna [15]	48,000	SC	5,000T
SARPOM	Trecate, Novara [16]	25,000	SC	4,300C
SARN	Novara [17]	1,500	SLA	—
S.P.I.	Fornovo, Parma [18]	2,200	S	—
Stanic	Bari [19]	47,000	S	—
	Leghorn [20]	50,000	SLA	—
Standard-ESSO	Trieste	6,100	S	—
STOI	Florence [21]	15,000	S	—
Volpato	Milan	2,100	S	—

[1] 3,000 b/d thermal reforming; cat. reformer under construction. [2] 5,500 b/d Platforming; hydrodesulfurization 6,000 b/d. [3] 5,000 b/d cat. reforming, 1,800 b/d thermal reforming. [4] To be raised to 40,000 b/d in 1959. 3,000 b/d Platforming. [5] 6,600 b/d thermal reforming; 2,000 b/d Platforming; 1,650 b/d cat. poly. [6] Revamping visbreaker to 8,000 b/d. topping. Cat. reforming 2,340 b/d. [7] 500 b/d cat. reforming. [8] 3,000 b/d thermal reforming capacity; 6,700 b/d cat. reforming. [9] 1,100 b/d reforming. Platformer and desulfurization units planned. [10] 1,500 b/d cat. reforming. [11] 500 b/d reforming, 3,000 b/d vacuum dist. [12] 500 b/d reforming. Refinery to be dismantled and completely rebuilt near Fregene, Rome. [13] 5,000 b/d cat. reforming. [14] 10,000 b/d cat. reforming and 11,000 b/d hydrodesulfurization building and MEK plant expanding, completion late 1958; TCC unit to be converted to crude processing 1959. [15] 2,000 b/d thermal reforming; 4,000 b/d cat. reforming; 1,400 b/d gas-oil desulfurizer under construction. [16] 3,750 b/d thermal reforming, 400 b/d cat. poly. [17] Refinery dismantled. Plant being moved to Gela, Sicily, to process to asphalt heavy crude from Gela oil-field of AGIP-Mineraria. [18] 3,000 b/d cat. reforming. [19] 6,000 b/d cat. reforming. [20] 6,000 b/d cat. reforming. [21] Refinery being completely renovated.

Note: Two new refineries are planned in Sicily; Soc. Mediterranea at Milazzo (Messina) 50,000 b/d; ISLOM at Palermo 8,000 b/d.

Capacities are in barrels per day. Key to type of plant: S—Skimming; L—Lubricating; A—Asphalt; C—Cracking; Comp.—Complete.

Under cracking capacity to indicate type: T—Thermal; C—Catalytic.

(Continued)

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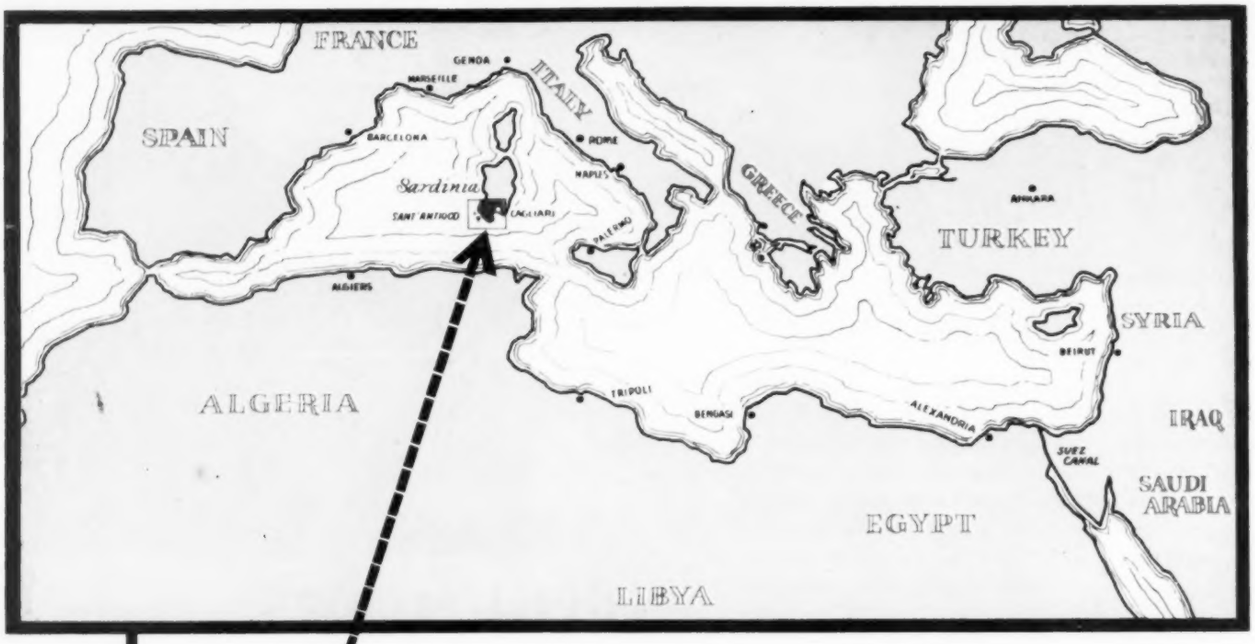

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ITALY — Summary Statistics

	1958 est.	1957
Imports, million tons	13.0	11.6[1]
Refining capacity, b/d average	604,000	604,000[2]
Domestic consumption, 1,000 tons:	1st 7 mos.	Year total
Gasoline	1,720	1,600
Kerosine	200	154
Gas-diesel oil	2,040	1,865
Fuel oil	7,650	6,835
Natural gas, billion cubic feet	—	176.7
	1st 7 mos.	1st 7 mos.
Exports 1,000 tons:		
Gasoline	902.7	803.5
Kerosine	134.9	183.6
Gas-diesel oil	936.5	1,050.4
Fuel oil	1,702.9	900.4
Total	3,677.1	2,937.9

[1] 1957 total in barrels— 146.76 million.
[2] Does not include Sicily's 98,100 b/d capacity.

can International Oil Co., the operating affiliate of Standard Oil Co. (Indiana) which has major resources.

Taxation is about 41% on corporate profits (see *World Petroleum Report—1957* for a brief review). Repatriation of profits is guaranteed under Decree 211 of March 2, 1948.

Italy's crude imports involve the spending of hard currency which, fortunately, is compensated to a certain extent by recovery of such currency. In 1957, the country spent over $269 million for crude-oil purchases, but it recovered about $185 million, or about 54.6%. This recovery was achieved as follows: processing for third parties, $17.5 million; exports, $95 million; expenditures in Italy by foreign companies, over $55 million; purchase of gasoline by foreign tourists, $15 million; investments by foreign companies, about $1.6 million.

OIL'S IMPORTANCE TO ITALY

The importance of oil in Italy is best expressed in accompanying table which shows: (1) Oil supplied 33.2% of Italy's energy in 1957; (2) Oil supplied 13% of government revenues during 1957.

ITALY'S ENERGY BALANCE*
(In thousands of tons of coal-equivalent, 7,400 k.cal./kg)

		Per Cent
Solid fuels	12,407	26.2
Liquid fuels	15,713	33.2
Methane gas	5,585	11.8
Electrical energy	13,657	28.8
		100.0

Source: Riccardo Beer, Unione Petrolifera, Rome.

SICILY

PHYSICAL DEVELOPMENT

EXPLORATION: Nearly 65% of Sicily's total acreage is now covered by exploration concessions. So far, companies active on the island have spent £23 million, and they are committed for another £38 million during the next few years.

Gulf, the first company to start activities in Sicily after World War II, has been responsible for more than 50% of the total exploration and production expenditures to date. ENI, however, now holds permits over a larger area than does Gulf, and it operates in behalf of Snia Viscosa in that firm's permit areas.

A total of 157 wells, representing footage of over 850,000 ft, has been drilled since 1950, when systematic exploration got started.

In Ragusa in 1958, 38 wells (including 18 development and 20 wildcat tests) were completed; and 17 new tests were being drilled at the end of the year. At the middle of 1958, British Petroleum reported oil flowing from 4,400 ft in a wildcat test near Vittoria, though not in commercial quantities.

In January 1958, Gela 4 started; and, at mid-year, Gela 5 was below 13,914 ft. There were also four other wells drilled in the vicinity of the Gela field during 1958.

PRODUCTION: Sicily's crude oil is very heavy, of the asphalt-base type, but the two producing fields are among the largest in western Europe. Ragusa's output, which hit 1,107,000 tons (about 23,000 b/d) in 1957, was reported moving towards annual production of some 1,205,000 tons in 1958 (about 25,000 b/d average). At Gela, ENI expected to produce about 15,000 tons in 1958.

In 1958, ENI also brought in a gas well in western Sicily, near Castelvetrano, with a flow of 1.5 million cubic feet per day; and Gulf brought in a gas discovery late in 1958 on its Fiume Platani permit, which tested about 2.8 million cubic feet daily.

REFINING AND TRANSPORTATION: Most of the crude oil from the Ragusa field flows through a 40-mile 14-in. pipeline to a terminal at Pensiola Magnesa, and to the RASIOM refinery in Augusta. ENI's affiliate, AGIP, plans a pipeline to take crude from the Gela field to the Gela harbor where a small (3,000 b/d) refinery it operates is to be expanded.

At Milazzo on the northeastern coast of the island, Soc. Mediterranea Raffineria Siciliana Petroli will build a new 52,000 b/d refinery, to be expanded eventually to 100,000 b/d. It will process Middle East crude and produce a complete line of products—including gasoline, fuel oil, diesel fuel, kerosine, jet fuels, LPGas, etc.

OIL LAWS*

The favorable 1950 oil law in Sicily has not been changed; hence exploration can be expected to continue its rise. However, the Sicilian regional assembly did adopt one small change in June of 1958. This was a law providing that 25% of all income (rents, royalties, taxes) to the region during the first three years of each concession will be put into a special fund and be spent in the commune where the oil deposits lie. The money is to be spent for public works, encouragement of industrial development, and other projects of general social interest.

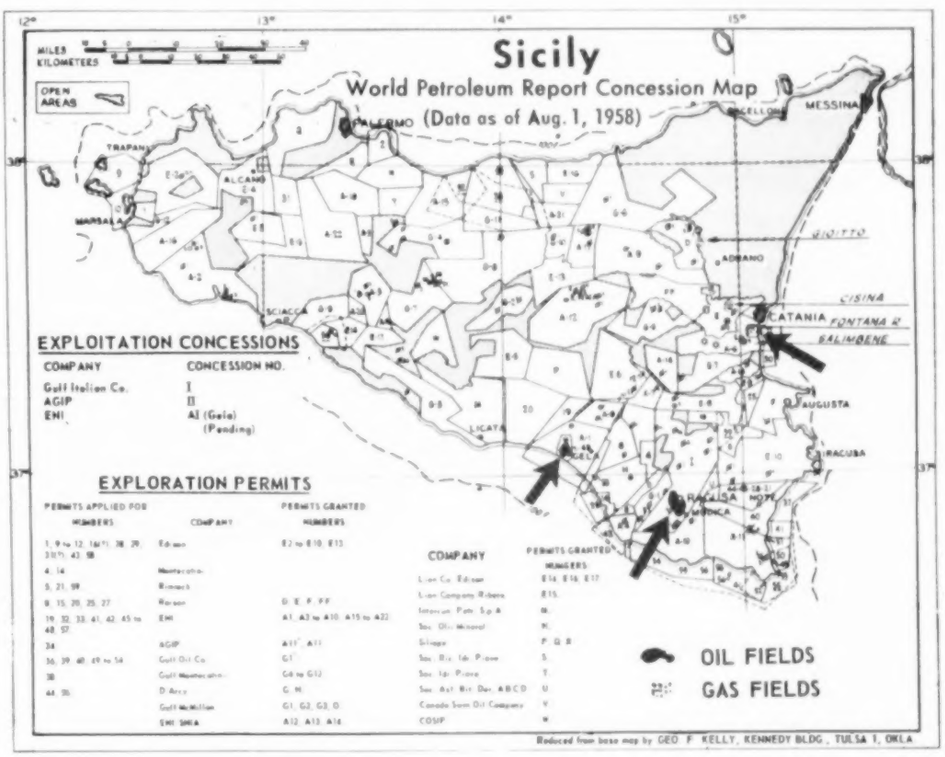
Apart from Sicily, there are four other regions in Italy which enjoy semi-autonomous status and are free to make their own oil-search regulations, viz., Sardinia, Trentino-Alto Adige (southern Tyrol), the Trieste area, and Valle d'Aosta.

Recently, however, by a ruling of Italy's supreme court, semi-autonomous Sicily has been denied the right to issue refining concessions on its own, even though it has its own oil law. As a result, decrees issued during 1958 authorizing construction of four new plants in Sicily have been annulled.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein.)

NATIONAL FACTORS

No change has occurred in the government's favorable attitude toward investment by international oil companies. Taxation is limited in the oil law. There is considerable trained oil labor available; and the general unemployment problem makes hiring of Sicilian labor, even in place of machine work, advisable. END



MALTA

PHYSICAL DEVELOPMENT

EXPLORATION: Drilling of the first deep test well in Malta by BP Exploration Co. began September 1, 1958. The well is near the village of Naxxar, about four miles northwest of Valetta, and is known as Naxxar No. 2. A shallow exploration well was drilled in the vicinity in 1955. A drilling rig capable of reaching a depth of 15,000 ft was brought from Sicily. Previously, the company had carried out, under license, a geophysical survey of Malta, as well as surface studies and structural drilling.

PRODUCTION, REFINING, MARKETING: There is no production or refining. All oil needs are imported.

OIL LAWS*

The Malta concession was granted to BP Exploration Co. on March 24, 1958. It lays down an initial exploration period of five years, with an option to extend this for a further two years. The concession covers the whole island of Malta and its dependencies. Initial area must be reduced by 50% at the end of the first three-year period, and to 25% of the original area after five years.

The company may surrender the whole or any part of the area at any time. The working obligations accepted include the spudding in of a deep test well within six months. The well was begun within this period.

There is a rising scale of rentals, and royalty on any commercial production will be 12½%. This is linked with a 50-50 provision following the usual pattern, although a new tax law may be needed to put it into effect.

* Copies of oil laws cited are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NETHERLANDS

PHYSICAL DEVELOPMENT

EXPLORATION: Past work by NAM (Nederlandse Aardolie Mij.), owned by Jersey Standard and Shell in equal parts, was reviewed in *World Petroleum Report—1958*. In 1957, exploration by NAM (the only exploring company) was concentrated in the West, and is summarized in accompanying tables. During the January through June period of 1958, two discovery wells were reported: Moerkapelle 4 at 5,660 ft, 9.3 miles NE of Rotterdam, in Dogger (cornbrash) sand, initial production of 5 b/d; and Werkendam 1 at 7,460 ft, 17.7 miles SE of Rotterdam, in Dogger (cornbrash) sand, initial production 31 b/d.

At the end of June, one exploration rig was working and one development rig; 12 party-months of geophysical work were done during the period, with two seismic parties operating. No geological work was done.

NETHERLANDS — Historical Drilling Review

	Oil	Gas	Dry	Total
1953	50	2	10	62
1954	38	0	19	57
1955	16	2	5	23
1956	9	3	7	19
1957	58	3	4	65
Jan. June 1958	16	2	5	23

The cumulative total of wells drilled to June 30, 1958, is 562—of which 443 were development and 119 exploratory. All wells drilled by NAM, owned by Shell group and Standard Oil Co. (New Jersey).

PRODUCTION: Production of natural gas for 1955 was 220 million cubic meters; 1956—166,500,000 cubic meters; 1957—220 million cubic meters. Production of crude oil has risen sharply in The Netherlands during the postwar period—from about 6,000 metric tons in 1945 (about 120 b/d) to more than 1,500,000 metric tons (30,000 b/d, approximately) in 1957, and to an estimated 30,135 b/d in 1958.

NETHERLANDS — Operating Refineries
(Barrels Per Day)

Name of Company	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
NV de Bataafsche Petroleum Mij. (Shell)	Pernis[1]	300,000	Comp.	86,000TC
Caltex Petroleum Mij. NV	Pernis[2]	46,000	SC	9,000T

[1]10,000 b/d thermal reforming, 20,000 b/d thermal cracking, and 66,000 b/d cat. cracking. Cat. reformer 12,700 b/d; two hydrodesulfurizers, 16,400 b/d and 7,800 b/d completed 3rd quarter 1958. Alkylation plant 2,800 b/d.

[2]7,000 b/d thermal reforming. 7,000 b/d Platformer and Unifier, 950 b/d cat. poly

To denote type plant: Comp.-Complete; S-Skimming; C-Cracking, Under Cracking; T-Thermal; C-Catalytic.

Reserves: Proved reserves of gas in the northeastern region of The Netherlands are now sufficiently large to guarantee a supply for the next 20 years at the rate of 550,000 cubic meters (19,415 mcf) daily. Proved reserves of crude oil, as of the end of 1956, were estimated at 16,400,000 metric tons, or about 123 million barrels (government estimate).

NETHERLANDS — Refinery Output*
(Thousands of Metric Tons)

Products	1959 Forecast	1960 Forecast
Motor gasoline	3,066	2,998
White and industrial spirits	112	112
Kerosine and jet fuel	1,371	1,451
Gas-diesel oil	3,343	3,333
Fuel oil	6,067	5,828
Lubricants	114	118
Others	922	1,031
Total	14,995	14,871
Refinery in own use and losses:	1,297	1,282
Total throughput	16,292	16,153

*Including liquefied gas, aviation gasoline, bitumen, paraffin wax, and petroleum coke.

TRANSPORTATION: The gas pipeline network is expanding rapidly, and an addition made in 1957 from the Caltex refinery (Pernis) will supply gas through a line being constructed to Utrecht. NAM is committed to deliver, over the next 20 years, at least 14,125,000 cu ft daily to the government's pipeline network. (All pipeline facilities are owned by the government for gas distribution.)

NV Rotterdam-Rijn Pijpleiding Mij. has been formed at The Hague to build a 185-mile 150,000 b/d Rotterdam-Ruhr pipeline, for completion in two years. Participants are Dutch-Shell 40%; Gelsenberg Benzin and Socony 40%; Caltex 20%. The system will help supply an 85,000 b/d refinery Shell has under construction at Godorf, a 71,000 b/d refinery now in operation at Gelsenberg, and a 43,000 b/d plant at Wesseling owned by Union Rheinische Braunkohlen Kraftstoff AG.

NETHERLANDS — Consumption of Oil Products
(Thousands of Metric Tons)

	Forecast	
	1959	1960
Motor gasoline	1,220	1,300
White spirit and industrial spirits	48	50
Kerosine, jet fuel	538	576
Gas-diesel oil	1,920	2,100
Fuel oil	2,550	2,850
Lubricants	115	119
Others*	425	450
Total	6,816	7,445

*Including liquefied gas, aviation gasoline, bitumen, paraffin wax, petroleum coke, etc.

REFINING: Refining capacity of The Netherlands will be increased by nearly a fourth in the spring of 1960, when Esso Nederland NV completes the 95,000 b/d plant on which construction now has begun. Other operating plants in the country are the 300,000 b/d Shell and 56,000 b/d Caltex plants at Rotterdam (Pernis).

MARKETING: Inland consumption has doubled since 1951; and, according to a recent statement by the president of Esso Netherland, a doubling of present consumption is foreseen within the next 10 years. However, 1958 was disappointing; and, because of slipping consumption, Caltex refinery expansion at Pernis has been slowed down. Consumption rose only 2% in 1958.

NETHERLANDS — Oil Imports, 1957
(Thousands of Barrels)

	Crude	Total Crude and Products
Mexico	107	107
Neth. Antilles	—	3,239
Puerto Rico	—	133
Trinidad	533	533
United States	2,734	5,846
Ecuador	120	120
Venezuela	33,044	33,770
Belgium and Luxembourg	—	6,026
France	—	123
Italy	—	18
Portugal	—	9
United Kingdom	—	1,872
USSR	—	36
West Germany	—	266
Aden	—	44
Bahrain	2,304[1]	2,685
Iran	449	575
Iraq	8,178	8,178
Kuwait	24,778	24,783
Lebanon	16,925[2]	16,925
Saudi Arabia	4,273	4,710
British Borneo	3,742	3,742
Singapore	—	773
Indonesia	128	156
Other countries	—	78
Total	97,315	114,747

[1]As reported. Other sources indicate Bahrain exports no crude petroleum. [2]Undisclosed quantities of crude oil from Saudi Arabia and Iraq.

Source: Central Bureau of Statistics, The Hague, through the US Department of State.

OIL LAWS

Controlling Statutes: Oil activities are governed by the Mining Law of April 21, 1910. A copy of this law, with amendments to September 1958, is on file at the offices of *World Petroleum Report*. A summary of this law is contained in *World Petroleum Report—1958*.

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NORWAY

There is no exploration or production in the country. Geology is not considered promising for oil.

There is one refinery, a 2,100 b/d skimming plant, with lube and asphalt facilities, owned by Norske Esso at Valloy per Tonsberg. A 40,000 b/d plant is now under construction by Bechtel Corp. for A/S Esso-Raffineriet Norge. It is to be the biggest plant in Scandinavia on its completion in 1960. Location is at Slagen, near Tonsberg, west side of Oslo Fjord. Graver Tank & Manufacturing Co. will build all 62 storage tanks. The new plant will produce a full range of products.

END

PORTUGAL

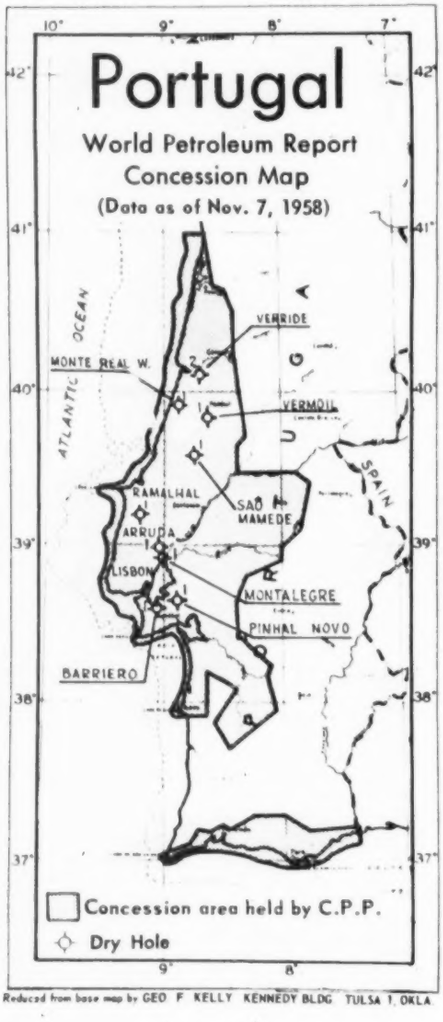
PHYSICAL DEVELOPMENT

EXPLORATION: Exploration in Portugal is directed by Mobil Exploration Portugal Inc., subsidiary of Mobil Overseas Oil Co., under a contract with Companhia dos Petroleos de Portugal SARL, in which the two major stockholders are the State of Portugal and A. Johnson & Co., Stockholm.

Surface geological mapping continued in 1958. Reflection-seismic and gravity surveys were suspended in 1957.

Drilling with two rigs operating since early in 1958 has resulted in the following:

1. Sao Mamede No. 1, 60 miles north-northeast of Lisbon, was completed in May 1958 at a total depth of 3,392 meters; dry and abandoned.



2. Vermoil No. 1, 77 miles north-northeast of Lisbon, abandoned at 7,575 ft.

3. Monte Real West No. 1, 75 miles north of Lisbon, was completed June 17, 1958, at a total depth of 1,360 meters; dry and abandoned.

4. Verride No. 2, 100 miles north-northeast of Lisbon, abandoned at 2,274 ft. Two wells were drilling as of February 5, 1959. Lourinha No. 1, 35 miles north of Lisbon was at 3,061 ft on November 25, 1958.

Samora No. 1, 20 miles northeast of Lisbon, was at 1,758 ft on November 25.

See map for location of the wells listed above and previous wells.

The Cia. dos Petroleos concession was held by a United Kingdom company prior to World War II. There are no other concessions in the country except the minor ones mentioned in *WPR—1957*.

PRODUCTION AND TRANSPORTATION (Crude): None.

REFINING: There is only one refinery, the Cabo Ruivo plant near Lisbon, owned by SACOR. The plant has about 22,900 b/d capacity, including 10,600 b/d thermal and catalytic cracking, 1,400 b/d polymerization unit, and 190 b/d lubricating-oil production. Expansion to 30,000 b/d plus addition of petrochemical facilities is now under way.

SACOR markets and enjoys exemption from income tax. It also benefits from decree-law of March 30, 1954, under which 80% of all gasoline, kerosine, and gas oil imported into Portuguese overseas territories (in practice, only into Angola) must come from a Portuguese refinery, while any importer bringing into Angola more than 30% above his previous year's imports must acquire such additional quantities from a Portuguese refiner. SACOR is also establishing itself as a marketer in Angola (through ANGOL, in which it has an 80% interest) mainly by supplying large users, and it is also contemplating beginning marketing in Mozambique.

SACOR is owned one-third by the State, 8.75% by Cie. Française des Pétroles, and about 58% by local financial and private interests. As well as having the exclusive rights for oil refining in Portugal, it also has the right to supply 50% of the country's consumption of petroleum products and part of the imports in overseas territories. It does not, however, engage in oil exploration and development.

MARKETING: Consumption of products is expected to rise about 8½% annually, and to reach about 1,450,000 tons (29,000 b/d) by 1963. Increase in inland consumption varied betweeen 7% and 9% annually during 1952-55, but fell in 1957 to only 2.3%—primarily due to the Suez crisis, the government having curbed consumption. Automotive gas oil now accounts for about half total gas-diesel oil sales, and represents nearly half the demand for motor fuels. Railways' consumption of fuel oil doubled during 1946-52, but has since remained virtually stable at about 140,000 to 150,000 tons annually (2,800 to 3,000 b/d). Industrial demand for fuel oil has risen over 70% in five years.

OIL LAWS*

Controlling Statutes* include: Regulations Regarding Concession Royalties from Oil Operations in the Overseas Provinces (Decree 41356); Regulations Regarding Income Tax on Oil Operations in the Overseas Provinces (Decree 41357); Mining Law of Portugal—Decree No. 18713 of July 11, 1930. For a summary of the 1930 law, *see World Petroleum Report—1958* and *1957*.

Operations by Cia. dos Petroleos are under Portuguese Oil and Natural Gas Concession, Decree 28575, published April 7, 1938. An English translation of this concession is kept on file at the offices of *World Petroleum Report* in New York, as well as of the new Gulf-Pan American concession in Mozambique, a Portuguese possession.

NATIONAL FACTORS

During 1958, Rear Admiral Americo Deux Rodrigues Tomas was elected president for seven years. There was some opposition, but he was the candidate of Premier Antonio de Oliveira Salazar, undisputed and highly respected leader of Portugal since 1926, and won by an overwhelming majority.

Premier Salazar has brought economic stability and gradual development. State participation is high, as shown by the most recent Six Year Plan which calls for State investments of escudos 30,000 million (the escudo is worth about US 3.5 cents) during which private investment will reach about escudos 38,000 million. National income is only about $204 per capita, lowest in western Europe, but a rise of about 27% is hoped for by 1964. The government's planning has resulted in a steady rise in oil consumption.

National attitude toward investors is quite nationalistic, but workable. There are no restrictions on import of capital, although its export is subject to government approval. Tax maximum is about 33%. Wage levels are very low.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NEED OIL LAWS? CONCESSION TEXTS?
All the World's oil laws and concessions are kept on file, *in English translation*, by us. See World Petroleum Legislation Report, page 22 this volume.

SPAIN

PHYSICAL DEVELOPMENT

EXPLORATION: Spain and her territories (especially the Spanish Sahara) will become the scene of one of the world's larger exploratory efforts beginning 20 days after the new oil law's regulations have been published. A number of companies, including Standard Oil Co. (New Jersey) and other majors are watching developments, and will probably participate.

A brief history of exploration is given in *World Petroleum Report—1957*. As therein noted, since 1952 exploration on all but concession areas previously obtained has been a monopoly of the government through the various subsidiaries of the government's INI (Instituto Nacional de Industria). There are some private companies involved, including those in VALDEBRO, composed of General American Oil Co. of Texas with associates (see *WPR—1957*) [since that issue, TULM Corp. is known to be a participant] and INI. Other companies are CAMPSA, the government's distribution monopoly, and CIEPSA. The California Texas Oil Co. (Caltex) is negotiating through an affiliate for a concession in northern Spain, on lands adjacent to CAMPSA concessions near Guernica, north of Bilbao.*

In 1958, the German firm of C. Deilmann Bergbau GmbH, in cooperation with CIEPSA, continued exploration activities in the upper Ebro valley in northern Spain. Up to the end of August, detailed geological investigations had been done for several months; seismic work extended over eight party-months, and gravimetric measurements also over eight party-months. During 1958 (through August) four wells were drilled, as follows:

Alda 1: Abandoned in May 1958 in Lower Cretaceous at a total depth of 4,508.7 meters. $6^5/_8$-in. casing was run and cemented. Production tests of horizons with gas shows, as well as open-hole tests, were made; but this work has not as yet been completed.

Treviño 2: Abandoned, April 1958, Middle Cretaceous at a total depth of 1,938.5 meters. Two tests were run on porous sandstone layers of the Cenoman which yielded salt water.

Treviño 3: Spudded during May 1958, and in mid-August was in Middle Cretaceous (1,438.0 meters). Some oil shows had been found. The well is being deepened.

Laño 2: Drilling operations were started in February 1958; and, on August 31, 1958, the well had reached the Cretaceous at 1,967.45 meters.

Summary of Valdebro Activities November 6, 1957, to December 31, 1958: During the November 6, 1957, to December 31, 1958, period Valdebro continued an active program of geological, geophysical, and drilling activity in most of the possibly petroliferous areas of the peninsula. There were three drilling rigs and four seismic crews in operation during the latter half of the year.

The exploration agreement between the Institute of National Industries and the American participants, originally entered into in 1952, has been extended. This group of American interests is headed by General American Oil Co. of Texas; and includes DeGolyer and MacNaughton, Delta Drilling Co., Lion Oil Co., E. E. Fogelson et al. DeGolyer and MacNaughton furnishes technologists both in Madrid and Dallas, and Delta Drilling Co. supervises the drilling operations. Spanish personnel is used extensively throughout the organization.

The new petroleum law reserves 3,500,000 hectares to INI, of which 800,000 hectares, comprised of 20 permits of 40,000 hectares each, will be dedicated to Valdebro.

*For a review of petroleum possibilities, see *Posibilidades del Subsuelo Espanol en su Relacion con el Origen del Petroleo y Sus Condiciones de Yacimiento*, by Jose Maria Rios; published in 1958 by Editorial Alhambra SA; Claudio Coello, 76, Madrid.

SPAIN — Petroleum Refineries
(Data as of July 1, 1958)

Name of Company	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
		BARRELS PER DAY		
"Campsa" Cia. Arrendataria del Monopolio de Petroleo SA	Barcelona	700	S	—
"Cepsa" Cia. Espanola de Petroleo SA	Canary Islands [1]	70,000	Comp.	3,500 T
Refineria de Petroles de Escombreras SA	Escombreras [2]	80,000	SL	—

[1] 5,000 b sd Platforming, with Udex unit; 3,000 b d thermal reforming; 5,000 b d Edeleanu plant planned; 3,000 vis-breaking, 500 b d lube plant; 2,000 b d asphalt plant.

[2] 9,000 b d thermal reforming; 11,000 b sd Platformer; 460 b sd cat-poly.

S - Skimming. Comp. - Complete. T - Thermal Reforming. L - Lubricating.

WELLS DRILLED BY VALDEBRO

NOVEMEBER 6, 1957 to DECEMBER 31, 1958

Almarchal (Cadiz) (Valdebro No. 8) bottomed at 11,020 ft, September 28, 1957, in the Eocene. Production tests of gas were noncommercial and the well was abandoned November 22, 1957.

Moguer (Huelva) (Valdebro No. 11) bottomed at 8,113 ft on November 15, 1957, in the Paleozoic. No shows of oil or gas were encountered.

Almonte (Huelva) (Valdebro No. 11) bottomed at a depth of 4,410 ft on December 27, 1957. No shows of oil or gas were found.

Puerto de Ojen (Cadiz) (Valdebro No. 13) bottomed at 5,744 ft on March 2, 1958 in Eocene due to hole difficulties. Slight shows of gas were recorded between 2,650 ft and 4,400 ft.

Cerro Gordon (Cadiz) (Valdebro No. 14) was drilling at 11,454 ft at the end of 1958, probably in the Triassic Keuper. This well has encountered shows of oil and gas which will be more thoroughly tested before the well is abandoned.

Quintana Redonda (Soria) (Valdebro No. 15) reached 3,794 ft in Paleozoic rocks April 30, 1958. The Jurassic and Triassic sediments were not present, and the well passed directly from Cretaceous to Paleozoic metamorphic strata.

Gormaz (Soria) (Valdebro No. 16) bottomed at 7,218 ft in Buntsandstein September 3, 1958. There were no shows of oil or gas. The Basal Triassic yielded salt water on drill-stem test.

Monegrillo (Zaragoza) (Valdebro No. 17) bottomed at 4,745 ft in Paleozoic rocks on July 5, 1958. Lack of fossils prevented precise identification of the stratigraphy. Normal facies of Eocene-Cretaceous and Jurassic were absent. Salt water was produced on drill-stem test from porous zones in the dolomite and sandstone overlying the Paleozoics.

Pamplona (Navarra) (Valdebro No. 18) was drilling at 6,135 ft at the end of the year. This well has had oil and gas shows which will be thoroughly tested before the well is abandoned.

La Zaida (Zaragoza) (Valdebro No. 19) was completed at 5,569 ft in the Paleozoics on November 24, 1958. Salt water was recovered on the drill-stem test in the Buntsandstein.

Retuerta (Burgos and Santander) (Valdebro No. 20) was drilling at 328 ft on December 31, 1958.

(continued)

SPAIN *(continued)*

CAMPSA has been less active lately, concentrating more on geological work than drilling. For a review of drilling by this and other companies, see *World Petroleum* for October 1956 and March 1958.

A local company, Petrolifero Iberica, has been joined by a German concern, Deutsche Schachtbau und Tiefbohrgesellschaft GmbH, which acquired an interest in the local company which has a number of concessions in the Bilbao, Vitoria, and Pamplona areas. Gas and oil shows have been found in several stratigraphic tests. Two light rigs have been shipped in.

PRODUCTION: There is no indigenous crude production, except some oil-from-coal plants covered under the REFINING section of this article.

TRANSPORTATION: There are no crude-oil pipelines of importance. A 485-mile products line from Rota, diagonally across Spain to Zaragoza, was completed in 1957. It supplies USA air bases. The line is telescoped, including 12-, 10-, 8-in. sections.

REFINING: In addition to the refineries listed in the accompanying table, there is a 25,000 b/d refinery planned at Puertollano by a subsidiary of INI.

As covered in *World Petroleum Report—1958*, p. 207, there is a complex of shale-oil plants known as Empresa Nacional "Calvo Sotelo" at Puertoallano. Stock in the company is to be sold to the public soon, according to reports.

MARKETING: Increasing industrialization is raising demand at a rapid rate. During the 1953-57 period, it nearly doubled; and total consumption of energy during the same period rose 35%. About 20% of energy use is supplied by oil. Major recent increases in oil consumption have been in fuel oil, sales of which had risen by 1957 to 52%. Further substantial rises in fuel-oil demand are expected in the next few years, despite the prospect of increased local production of coal.

Consumption of gas-diesel oils almost doubled during the 1953-57 period, to 14,200 b/d in 1957; while consumption of gasoline in the same period rose by 28%, to about 12,300 b/d. Rising sales of gas-diesel oils are due partly to the expansion of industry and partly to the increasing use of diesel-engined buses, tractors and, to a lesser extent, diesel locomotives.

OIL LAWS*

On December 22, 1958, a new oil law was passed which is summarized in this report. On a net basis, it is a workable and liberal law which will undoubtedly attract international oil companies. It applies not only to peninsular Spain, but to Spanish Guinea and the Spanish Sahara. The latter, a completely unknown territory (geologically speaking), is particularly attractive. Within Spain, only the Ebro valley and Andalusian basin to the west have good oil possibilities.

While the law does not limit foreign participation [one of the big stumbling blocks to work under is the previous Spanish Mining Law], it gives preference to companies admitting Spanish participation. Partly, this is based on the exchange situation, since Spanish ownership reduces the amount of exchange needed for remitting profits in the event of a discovery.

Applications cannot be made under the law until 20 days after the regulations have been passed. This does not seem enough time to study the regulations, which will define such important points as minimum expenditure, etc.

While the law limits remission of earnings to 20% of same during the first five years, this is little hindrance, since expenditures during the first five years after discovery within Spain would undoubtedly be high, and there would be little left to remit in any case.

Arbitration under the law is entirely in Spanish hands, but this is equally the case in the French Sahara law. Provision is made for cancellation of concessions by the government without notice to the concessionaire to give him an opportunity to correct violations—which may be a source of difficulty, particularly since the reasons for cancellation are vague, being described as "failure to observe obligations."

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

SPANISH PETROLEUM LAW†

(December 1958)

Covers following zones: Zone I—Peninsular Spain, the Balearic Isles, the Canary Islands, and the Spanish territories in North Africa. Zone II—Territories of Guinea. Zone III—Territories of Spanish West Africa. Surface prospecting may be carried out freely. Before applying, must constitute a Spanish company or a company domiciled in Spain; company may be of foreign nationality. Permits and concessions may not be acquired, directly or indirectly, by foreign States or governments. Permits and concessions may be transferred with prior authorization.

EXPLORATION: Prospecting Permits—Confer exclusive right for 6 years in Zones I and III, and for 8 years in Zone II. May be extended 3 years, with the original area to be reduced by 25% for Zone I, and by 50% for Zones II and III. In "justified" cases, second extension for another two years. Permit in Zone I then again reduced by 25% of original permit. In "exceptional" cases, a third and

(continued)

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SPAIN ***(continued)***

final extension of up to three years granted if annual investments made in excess of maximums. **Area:** One exploitation concession in Zone I for each 10,000 hectares of prospecting permit area up to and including 40,000 hectares. One in Zone II for each 5,000 hectares covered by a prospecting permit. One concession in Zone III for each 125,000 hectares. Total concessions may not exceed 50% of original permit area. One applicant may have, in Zone I, up to 20 permits, provided total area does not exceed 800,000 hectares. In Zone II, up to 4 permits. In Zone III, up to 16 permits. **Applications:** Preference given with "consideration to be given to the percentage of Spanish capital." Under equal conditions, priority of applications maintained. Applications presented on the same date considered simultaneously. **Bond Deposit:** In Zone I, 12 pesetas per hectare; in Zone II, 10 pesetas per hectare; in Zone III, 6 pesetas per hectare.

EXPLOITATION: Duration: 50 years. May be extended for another 10 years. Concessionaire may refine, store, transport, and sell within Spain or abroad. When existence of hydrocarbons in marketable quantities has been proved, concession will be granted within three months, by decree. Portions of prospecting permits not covered by concessions revert to government, and may be granted under competitive bidding. **Area:** May not exceed 50% of prospecting permit. Minimum 3,000 hectares. **Refining, Storage & Transportation:** Concessionaires may refine and process hydrocarbons they obtain in excess of national consumption. May also eventually carry out such operations for the national market whenever government so authorizes. Permits referred to have duration equal to exploitation concessions to which they pertain. **Taxation:** Subject to general taxation. May not be subjected to any other tax or discriminatory levy of any kind save for those established by present law. In no case double taxation by State and by provinces-municipalities. **Royalty:** Exploration permits pay per hectare and per year mining "royalty" on following scale:

	Pesetas
During initial duration of permit	1.00
During the first extension	2.00
During the second extension, if granted	4.00
During a possible, but exceptional, third renewal	4.00

Exploitation concessions pay, per hectare and per year, a "mining royalty" on the following scale.‡

	Gold	*Pesetas*
During first five years		0.80
During following five years		2.40
During following five years		6.40
During following five years		8.00
During following five years		6.40
During following five years		3.20
Until expiration		2.40

"Mining royalty" collected alternatively with tax on the gross proceeds, whichever amount is the greater. **Profits Tax:** In Zone I, tax on the gross proceeds is a minimum net profits tax of 13.5%. In Zones II and III, the tax 12.5%. Payable and not refunded, whatever results of fiscal year. **Depletion:** 25% of gross, or 40% of net before deduction of depletion. **Tax Rate:** 50% in any case, Advance tax or royalty deducted, and concessionaires exempt from rural, urban, industrial, and corporation taxes. Refining operations subject to general tax provisions. **Oil Use:** Concessionaires obligated to supply pro-rata crude products and gas for national consumption. **Exchange:** Foreign concessionaires to supply funds for peseta expenses. If earnings exceed total of expenses in Spanish currency, concessionaire may convert excess into foreign currency. During first 10 years, conversion limited to 20% of gross production. After first 10 years, may convert the total of the excess until amortization and transfer of profits realized. Thereafter limited to net profits in the fiscal year concerned. Current official exchange rates applied. **Laws:** Holders subject to Spanish laws and law courts. **Reserves:** National Institute of Industry reserves shall not exceed 3,500,000 hectares. Exact boundaries to be specified. **Regulations:** To be issued within 120 days. **Obligations:** During the entire period of validity of permits and concessions, the rights and obligations may not be altered or reduced.

‡One gold peseta equals 3.577 paper pesetas.

NATIONAL FACTORS

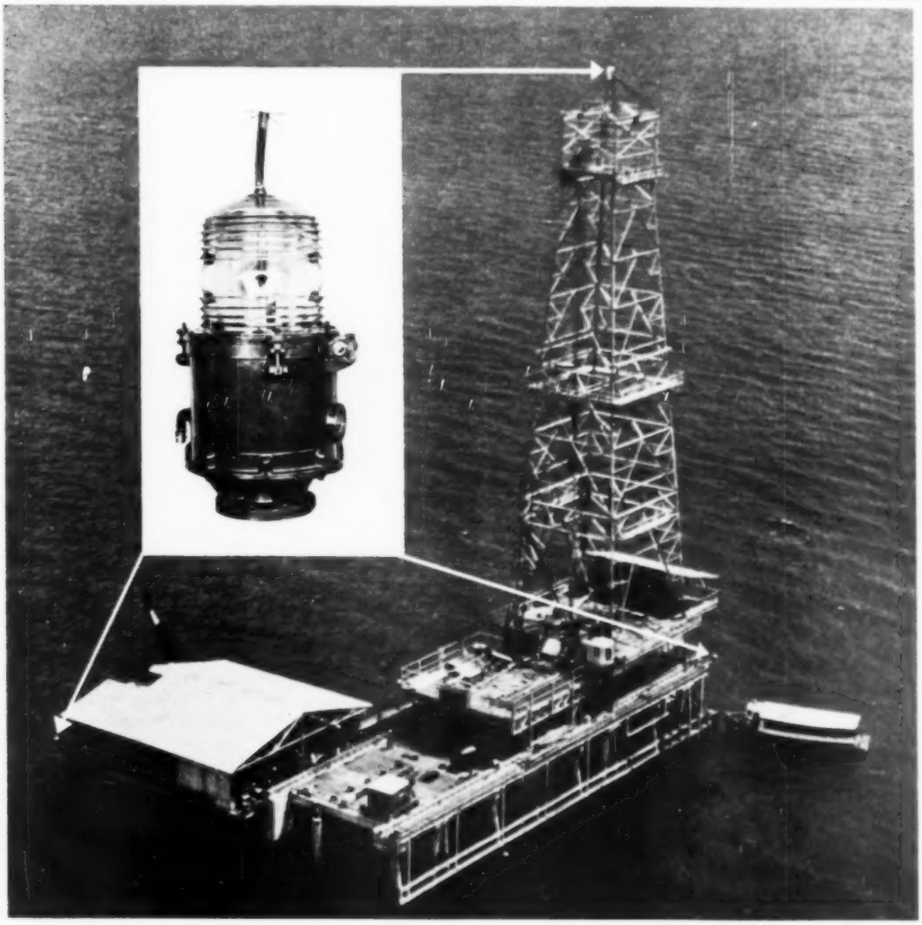
The government's attitude has become more favorable toward international oil investors since passage of the new oil law lifted the former 25% limit on non-Spanish ownership of corporations.

Politically, the situation has been stable, but is becoming rapidly unstable. General Franco has presided over Spain for many years; and, while his rule was absolute among the generation who remembered the consequences of Spain's disastrous civil war of the 1930's, the memory has become dim in the minds of the younger generation. The restlessness of the latter is aggravated by a severe inflation which hit the country partly as a result of the investment by the USA of over $500 million in the past few years for air bases and in loans to the government. Wage levels have lagged far behind prices; and, while labor unionization is still repressed, there have been several strikes in recent months—an almost unheard-of occurrence a few years ago.

The problem of succession is the major one confronting the Franco régime. While the young Don Juan has been selected as the transferee of Franco's power, it remains to be seen if this can be accomplished smoothly (if at all).

Taxation in the country is a maximum of 60%. There remain restrictions on exchange and convertibility of the peseta, newly devalued to 42 per US dollar; but the oil law provides for and defines extent of convertibility of oil earnings.

There exists a reservoir of good will toward nationals of the western nations and the United States, which could be significant. The investment history of Spain is also good, with no recent expropriations. END



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SWEDEN

PHYSICAL DEVELOPMENT

EXPLORATION AND PRODUCTION: There is no oil exploration or production in Sweden.

REFINING: There are five refineries in Sweden with a total capacity of 60,800 b/d (see table). Preliminary discussions are taking place with Standard Oil Co. (Indiana) concerning refining in the country.

MARKETING: Consumption of oil declined slightly during 1957 to 181,958 b/d (see table). The economy is passing through a phase of adjustment which accounts partly for the decline, along with warmer weather than usual. Final figures for 1958 are not yet available, but indications are that motor-gasoline demand will be up, while another unseasonably warm winter will retard demand for heating oils.

A government committee estimated during 1957 that total energy demand will nearly double during the 1955-80 period, with oil use rising at least at the same rate.

Partly as a result of the Suez crisis, a new law was passed for increased oil-storage facilities. It places a very heavy burden on the oil industry, although borne 60% by the government. It requires a total expenditure of 600 million kroner during the 1958-62 period (about $115.6 million) and is roughly equivalent to around 14 million barrels capacity (actual volume is not stated for security reasons).

OIL LAWS*

Minerals are governed by Mining Act of June 3, 1938, and the Act of May 28, 1886, relating to coal fields, etc. There is no law specified for oil.

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein). END

SWEDEN — Oil Refineries
(As of July 15, 1958)

Name of Plant	Plant Location	Crude Capacity	Cracking Capacity
		(Barrels per day)	
A-B-Nymas Petroleum	Nynasham[1]	14,000 Comp.	1,000 T
	Malmo	1,900 SA	—
	Goteburg	2,900 S	—
Kappartrans Oljeakliebolag	Goteburg[2]	40,000 S	—
Svenska Skifferoje A. B	Narkes-Kvarntorp[3]	2,000 S	—

[1]1,900 b/d thermal reforming, 35,000 b/d capacity increase, and 6,850 b/d Platformer under construction. [2]4,500 b/d thermal reforming and 5,500 catalytic reforming. [3]Shale-oil plant under construction: Ammonia plant-Hydrofiner, and Hydroformer for gasolines.
Comp. - Complete. S - Skimming. A - Asphalt. T - Thermal cracking.

SWEDEN — Consumption of Oil Products
(Thousands of Cubic Meters)

Year	Gasoline	Other Automotive Fuels	Fuel Oils	Other Petroleum Products	Total
1957	1,734	1,299	7,095	414	10,542
1956	1,654	1,319	7,403	417	10,793
1955	1,524	1,217	6,559	371	9,671
1954	1,390	1,092	4,847	323	7,652
1953	1,265	983	3,921	284	6,453
1952	1,141	806	3,515	258	5,720
1951	1,024	777	3,180	271	5,252
1950	826	650	2,780	247	4,503
1949	719	550	1,890	210	3,369
1948	774	497	2,025	220	3,516

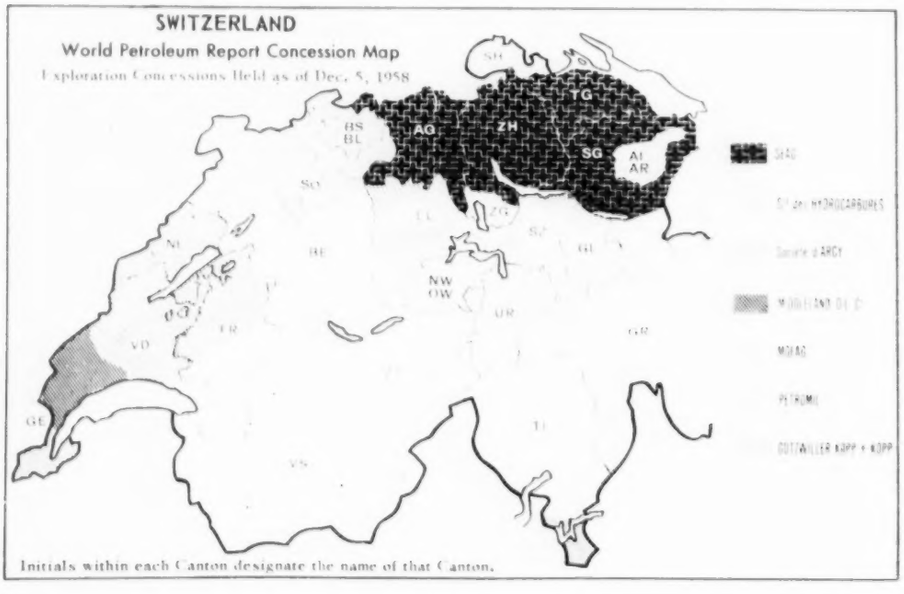
Source: US Department of State, based on 1957 Annual Report of Svenska Esso AB.

SWITZERLAND

PHYSICAL DEVELOPMENT

EXPLORATION: There has been a revival of interest in exploration, as the accompanying map shows. A German independent began exploratory drilling in the canton of Vaud on May 1, 1958. Gwerkschaft Elwerath spudded this initial test near Moudon. The well was dry. The company also owns 50% of SA des Hydrocarbures, of Lausanne, which holds concessions in two other cantons.

Two previous wells drilled in Canton Vaud were at Cuarny and at Servion. The Cuarny test, located just southwest of Lake Neufchâtel, was drilled to 7,293 ft in Dogger, with good oil shows reported in the Chattian between 1,300 ft and 1,640 ft. The Servion test, six miles northeast of Lausanne, was drilled to 4,700 ft, far short of the Chattian (Molasse).



The cantons of Berne, Solothurn, and Lucerne which originally had been expected to join the "oil concordat" of the cantons on the northeast, decided to form an oil concordat of their own, with the provision that foreign oil companies could compete for concessions if there was a majority of Swiss capital in the operating company. The "Bernese Syndicate," composed of a group of Bernese industrialists, had an agreement with Standard Oil Co. (N. J.) that, if they succeeded in obtaining a concession, Esso would acquire an interest in it and conduct the exploration program. Another applicant for concessions was the SOBEREP, formed by representatives of industry and trade in the cantons of Berne and Solothurn to go into partnership with Molasse Erdölförderungs AG (MOFAG). Petromil SA is also owned by MOFAG. Rimrock Tidelands Inc., an American independent, recently purchased MOFAG Oil Exploration Co. Inc.

Fribourg bowed to the federal council's opposition, in 1958, to foreign-controlled companies by dropping its original plan to grant BP a concession. Instead, the canton will now grant a 463-square-mile concession to SA d'Intérets Minièrs, a new, wholly-Swiss firm set up for the purpose. The company plans to contract actual exploration work to BP.

Schweizerische Erdöl AG (SEAG) received its concession, and surface mapping commenced shortly thereafter. 25% of SEAG is owned by Elwerath, which is the operator. The rest of SEAG is owned by a combine of large Swiss companies.

(continued)

SWITZERLAND *(continued)*

REFINING: There are only two small refineries. The Italo-Swiss company is considering construction of a refinery near Stabio, in the canton of Tessin. However, the company is awaiting the new federal legislation on petroleum before taking the step.

OIL LAWS*

The requirements for 75% Swiss participation seems to be no obstacle to participation by international companies. A number of arrangements have been made for the concessions to be taken out by a Swiss concern and farmed out to interested international companies.

Only one canton, Geneva, has a specific oil law (see *WPR—1957*). The federal government sent a circular letter in 1958 to all cantonal governments, and to various other entities, announcing proposals for a constitutional amendment which would give the federal authorities supervisory powers over the cantons in all matters concerning the exploration for, and production of, crude oil and natural gas and the refining and export of locally produced oil and gas. The amendment would entitle the federal authorities to pass an outline law regulating the grant of concessions by the cantons, while in certain specified circumstances the federal authorities would be allowed to grant such concessions themselves. The federal government would also be authorized to levy taxes on indigenous oil and gas, which would correspond to the present customs duties on imports. Cantonal assent has not yet been given.

The central concordat agreement for unified treatment of concessionaires within the areas of Berne, Lucerne, and Solothurn, dated October 21, 1957, has not as yet been finalized. Federal legislation for Switzerland still does not exist, and all oil regulation is in the hands of the cantons.

The canton of Fribourg has issued new regulations to its Mining Law of 4/10/1850.

NATIONAL FACTORS

The traditional orientation of the economy is toward private operation. There is no exchange control (the Swiss franc, valued at about 25 cents, is one of the world's hardest currencies), and income taxation is a maximum 15%.

There is, however, a long history of neutrality, and investment by international oil companies is looked upon suspiciously because it might compromise such neutrality. The requirement of 75% Swiss ownership (*see WPR—1957*) is a result of this attitude. Recently, as previously mentioned, this requirement has been made less detrimental by the use of separate companies to hold concessions, with farmouts to international companies. END

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

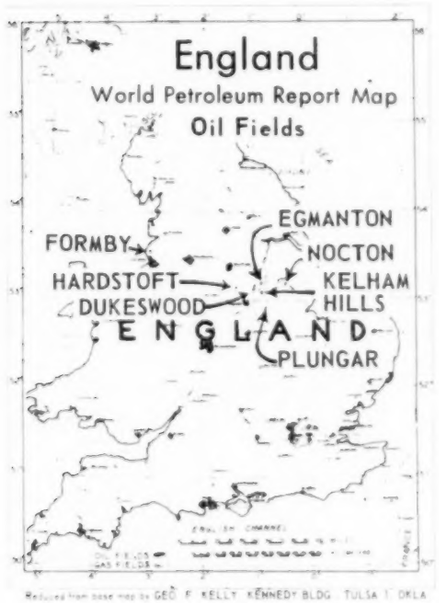
UNITED KINGDOM

PHYSICAL DEVELOPMENT

EXPLORATION: The search for oil began in 1934, as covered in *World Petroleum Report—1957* (p. 257), and has continued with some slight success; but large production has not been yet established.

During 1958, BP Exploration Co. Ltd. continued to search for oil and, also, on behalf of the Gas Council of Great Britain, for natural gas.

Exploration has concentrated mainly on Carboniferous structures in the areas around the existing oil fields in the East Midlands and in the Mesozoics of southern England. In other areas, a further well was drilled at Eskdale, Yorkshire, in the area proved to contain gas accumulations in Permian rocks; one well at Noke Hill, near Oxford, was drilled to test possible accumulations of gas in the Lower Paleozoics, and three shallow wells were drilled in Trias rocks in Lancashire for structure definition.



Reduced from base map by GEO. F. KELLY, KENNEDY BLDG., TULSA 1, OKLA.

The main target in the Carboniferous rocks of the East Midlands still remains the Millstone Grit Series, with the secondary target the Carboniferous limestone. Commercial production of oil is also being obtained from a sandstone in the Lower Coal Measures, some 500 ft above the top of the Millstone Grit. Within this Carboniferous area, 19 wells were completed by the end of the year, and preparation begun to delimit fields at Bothamsall and Corringham. Although oil was discovered at Langar last year, three further wells there have failed to prove any extension of accumulation. In the near vicinity, wells have been drilled at Cropwell Bishop, Colston Bassett South, Colston Bassett North, and Cropwell Butler—all sited on seismic-reflection survey culminations; but of these, only Cropwell Butler has given any positive indications of commercial oil. A further well drilled at Ironville, on a structure proved to contain gas, found the main gas-producing sand faulted out; while at Calow, on a simple anticline with gas, a second well found the producing sand somewhat tighter but still gas-bearing.

Further drilling was also undertaken in the oil fields at Plungar and Egmanton. Two accumulations were discovered in 1958—one at Bothamsall, Nottinghamshire, where the producing horizon is the basal sandstone of the Coal Measures. The second discovery was at Corringham, Lincolnshire, where the producing horizon is a sandstone, 500 ft above the base of the Coal Measures. Gainsborough No. 1, 2½ miles east of Corringham, tested 110 b/d from 4,600 ft during January 1959, the deepest find to date.

In the Mesozoic area of southern England, exploration has continued with wells at Shalford, in Surrey; at Fordingbridge, in Hampshire; at Noke Hill, in Oxfordshire; and Radipole, in Dorset. All have proved dry holes with the exception of Radipole which was still drilling at last report.

PRODUCTION: During 1958, production averaged about 1,587 b/d. This compares with 82,000 tons (about 1,640 b/d) produced in 1957. Most production in the Nottinghamshire area to the southwest comes from Millstone Grit, underlying the coal formations. In Nottinghamshire, the sandstone series generally lies from 1,914 ft to 2,643 ft.

Several small gas finds have been made, viz., at Ironville, Trumfleet, and Calow.

UNITED KINGDOM — Crude-Oil Production, 1958
(Long Tons)

January	6,732	July	6,421
February	5,947	August	6,314
March	6,869	September	6,436
April	7,026	October	6,898
May	7,062	November	6,677
June	6,474	December	6,971†
	Year (1958) 79,814 Tons		(1,587 b/d)

†Estimated.

TRANSPORTATION: Work has begun on what will be Britain's longest crude pipeline when it is completed by year-end 1959. The 60-mile 100,000 b/d line will run across southern Wales, linking BP's new deep-water terminal being built at Milford Haven with BP's Llandarcy refinery.

A significant experiment was being conducted during early 1959. Shipment of liquefied methane [methane is not generally referred to as LPG; its behavior qualities are quite different] from the USA was being attempted by Constock International Methane Ltd. and the British Gas Council via a specially fitted and refrigerated tanker. With the gas cooled almost to absolute zero, the loss through evaporation is virtually equal to the amount necessary to drive the ship. On its arrival in England, the gas will be piped to gas-consuming centers. The calorific values are extremely high; and the experiment, if successful, will afford the world a new source of energy. It has been tried in the United States, but without success.

REFINING: Refining capacity, estimated at 778,400 b/d at mid-1958 (36.9 million metric tons, abbreviated mm), was relatively unchanged at the year-end. This compares with 670,000 b/d at end-1957.

Over the first eight months of 1958, total throughput was 21.2 million tons against 17.9 mm in the same period of 1957. Throughput for

(continued)

UNITED KINGDOM *(continued)*

the year 1958 totaled 32 mm to 33 mm tons (640,000 b/d to 660,000 b/d) against 27.8 mm (556,000 b/d) in 1957.

The major refinery expansion project completed in 1958 was British Petroleum Co.'s Kent refinery, raising capacity to 142,000 b/d at a cost of some £26 million. The 130,000-ton-per-year (2,600 b/d) alkylation unit is producing high-grade aviation gasoline for the first time.

At British Petroleum's Grangemouth refinery, expansion is nearing completion to 3.1 mm metric tons (62,000 b/d) from 2.2 mm (44,000 b/d) at a cost of £4 million.

UNITED KINGDOM — Petroleum Imports (Crude and Refined), 1958

Crude and Partly Refined Oil	Quantity (Thousands of Imperial Gallons)	Value (Thousands of Pounds Sterling)
Eastern Hemisphere		
Middle East[1]	7,213,760	236,884
Europe[2]	52,824	2,520
Far East and Australasia[3]	47,103	2,166
Africa	—	—
Total Eastern Hemisphere	7,313,687	241,570
Western Hemisphere		
Latin America[5]	1,397,961	51,425
North America[6]	15,477	812
Total Western Hemisphere	1,413,438	52,237
Unallocated	60,251	2,132
Total crude oil	8,787,376	259,939
Refined Products		
Motor spirit	726,498	40,325
Spirit, other than motor spirit	35,872	2,508
Kerosine	315,505	15,151
Lubricating and other heavy oils	103,707	9,844
Gas oil	525,041	24,222
Diesel oil	22,251	1,029
Fuel oil	1,156,630	37,209
Total refined products	2,885,504	130,288
Asphalt and bitumen, natural (cwt)	1,374,320	887
Candles, nightlights (cwt)	n.a.	n.a.
Carbon black (cwt)	173,160	1,000
Lubricating greases and compounds (incl. cable impregnating compositions (cwt)	n.a.	n.a.
Petrolatum (cwt)	109,524	438
Petroleum coke (cwt)	n.a.	n.a.
Petroleum wax (cwt)	743,709	2,453

[1]Kuwait, Iraq, Iran, Qatar-Bahrain-Trucial States, Saudi Arabia. [2]Netherlands, Italy. [3]Sarawak. [4]United States. [5]Venezuela, Neth. Antilles, Trinidad, Colombia, Peru.

Source: Accounts Relating to Trade and Navigation of the United Kingdom. n.a. — Not Available.

UNITED KINGDOM — Monthly Average Refinery Throughput and Output of Finished Products

	1958 (Thousands of Long Tons)	1957 (Thousands of Long Tons)
Throughput:		
Crude and shale oils	2,687.9*	2,318.2
Refinery fuel	201.4*	174.2
Aviation and motor spirits	551.1*	492.3
Industrial and white spirits	11.8*	11.7
Kerosine:		
Burning oil	87.0*	59.6
Vaporizing oil	16.7*	10.4
Gas-diesel oils	514.9*	422.2
Fuel oils	1,021.5*	870.3
Lubricating oils	61.6*	61.9
Bitumen	72.9*	69.7
Total output of finished products†	2,486.5	2,144.0

*January to October only. †Includes minor products not shown separately, such as waxes, gases, miscellaneous.

Source: Monthly Digest of Statistics (Central Statistical Office)

Completion of expansion at Shell Haven from 3.75 mm metric tons per year (75,000 b/d) to 7.75 mm (155,000 b/d) was expected early in 1959. A recent new project comprises a 200-ton-per-day (1,400 b/d) fuel-oil gasification plant as base material for making synthetic nitrogen fertilizers. At Stanlow, Shell is constructing an £800,000 plant to produce an important aviation-gasoline component.

The first stage is nearing completion of Mobil Oil's new LPG recovery plant at Coryton. A substantial quantity of propane will be available shortly, and butane supply will follow.

At Milford Haven (South Wales), Esso Pe-

(Continued)

UNITED KINGDOM — Value of Petroleum and Petroleum Products Exported, by Country of Destination, 1958

Country of Destination	Thousands of Pounds Sterling
Channel Islands	984
Gibraltar	42
Ghana	464
Nigeria	584
South Africa	1,320
Fedn. of Malaya	249
Rhodesia/Nyasaland	103
Kenya	511
India	1,971
Pakistan	353
Singapore	632
Ceylon	324
Australia	889
New Zealand	787
Other Commonwealth	2,077
Irish Republic	10,844
Finland	593
Sweden	12,731
Norway	9,340
Denmark	17,713
West Germany	4,777
Netherlands	9,540
Belgium	1,286
France	3,842
Switzerland	145
Portugal	491
Spain	2,116
Italy	369
Turkey	510
Netherlands Antilles	8,012
Algeria	117
French West Africa	141
Canary Islands	202
Spanish ports in North Africa	17
Egypt	42
Southern Morocco	20
Iraq	191
Burma	332
Indonesia	1,067
Other countries	4,810
Total	100,538

Source: Accounts Relating to the Trade and Navigation of the United Kingdom.

UNITED KINGDOM — Crude and Refined Products Exports and Re-exports, 1958

Product	Quantity (Thousands of Imperial Gallons)
EXPORTS	
Crude and partly refined oil	n.a.
Motor spirit	585,516
Spirit, other than motor spirit	10,980
Kerosine	77,499
Lubricating oil and other heavy oils	99,403
Gas oil	440,336
Diesel oil	126,591
Fuel oil	735,681
Total	7,076,006
Bituminous asphalts (manufactured) and emulsions (other than for use as paint) (cwt)	1,364,720
Candles, nightlights, etc. (cwt)	n.a.
Carbon blacks, all kinds (cwt)	766,932
Lubricating greases and compounds (incl. cable impregnating compositions) (cwt)	599,589
Petroleum wax (cwt)	n.a.
Pitch (other than coal-tar pitch) (cwt)	n.a.
Total	2,731,241
RE-EXPORTS	
Motor spirit	35,795
Gas-diesel and fuel oils	58,870
Oil fuel bunkers in foreign trade:	
British flags	658,002
Other flags	243,915
	901,917

n.a. — Not available.

Source: Accounts Relating to the Trade and Navigation of the United Kingdom.

UNITED KINGDOM — Refining Capacity (As of Mid-1958)

NAME OF COMPANY	PLANT LOCATION	CRUDE CAPACITY	TYPE PLANT	CRACKING CAPACITY
BP Refinery (Kent) Ltd.	Isle of Grain, Kent [1]	180,000	SCL	12,500C
BP Refinery (Grangemouth) Ltd.	Grangemouth [10]	45,000	SC	12,500C
BP Refinery (Llandarcy) Ltd.	Llandarcy S. Wales	62,000	Comp.	12,500C
Berry Wiggins & Co. Ltd.	Kingsmouth on the Medway nr Rochester, Kent	3,200	S	—
	Weaste [2]	1,900	S	—
Briggs & Co. Ltd. Wm.	Dundee, Scotland	1,000	SLA	—
Carless Capel & Leonard	London	300	S	—
Esso Petroleum Co. Ltd.	Fawley [3]	228,100	Comp.	44,300C
Lobitos Oil Fields Ltd.	Ellesmere Port [4]	3,700	Comp.	800T
London & Thamshave Oil Wharves Ltd.	Thameshaven	2,000	LA	—
Manchester Oil Refinery Ltd.	Trafford Park [5]	3,500	Comp.	—
Scottish Oils Ltd.	Pumpherston, Scot.	3,500	SC	2,800T
Shell Refining & Marketing Co. Ltd.	Stanlow, Ellesmere Port [6]	100,000	Comp.	33,000C
Shell Refining & Marketing Co. Ltd.	Shell Haven, Essex [7]	75,000	Comp.	—
	Heysham, Lancs. [8]	36,000	SC	6,000T
Starhaven Refineries Ltd.	Ardrossan, Scot.	3,200	S	—
Mobil Oil Co. Ltd.	Coryton, Essex [9]	30,000	Comp.	9,500C

[1] 6,000 b/d Platforming, 10,000 b/d hydrofining building, 10,000 b/d cat reformer, 12,000 b/d thermal reformer; 10,000 b/d Hydrofiner, 2,250 alkylation unit, 45 t/d sulfur recovery unit.
[2] A 1,620 b/d two stage distillation unit under construction.
[3] 10,000 b/d Hydroforming capacity. Hydrofiner Steam cracker and butene dehydrogenation unit, mid-1958.
[4] 800 b/d Platformer.
[5] Doubled output of sulfonates in 1958.
[6] 13,000 b/d thermal reforming, 9,000 b/d Platforming.
[7] 10,000 b/d thermal reforming, 6,700 b/d Platforming, 80,000 b/d crude unit completed.
[8] 16,000 b/d hydrodesulfurizer projected for 1960.
[9] 4,000 b/d thermal reforming, 6,000 b/d visbreaking.
[10] 6,000 b/d catalytic reforming.
Existing crude unit to be replaced by new 65,000 b/d still, completion 1959.

S - Skimming; C - Cracking; L - Lubricating; Comp. - Complete; A - Asphalt. Under Cracking: C - Catalytic, T - Thermal.

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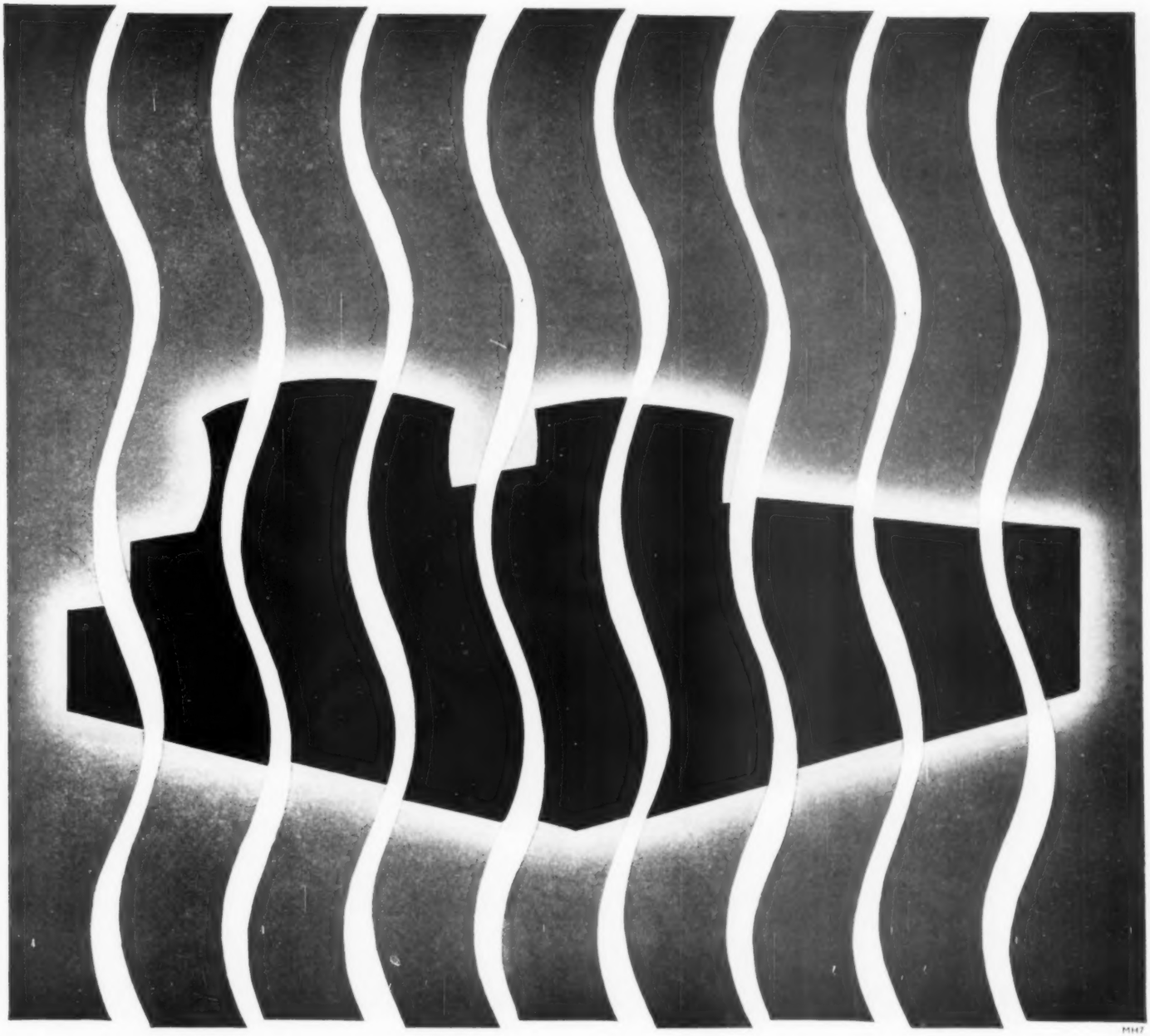

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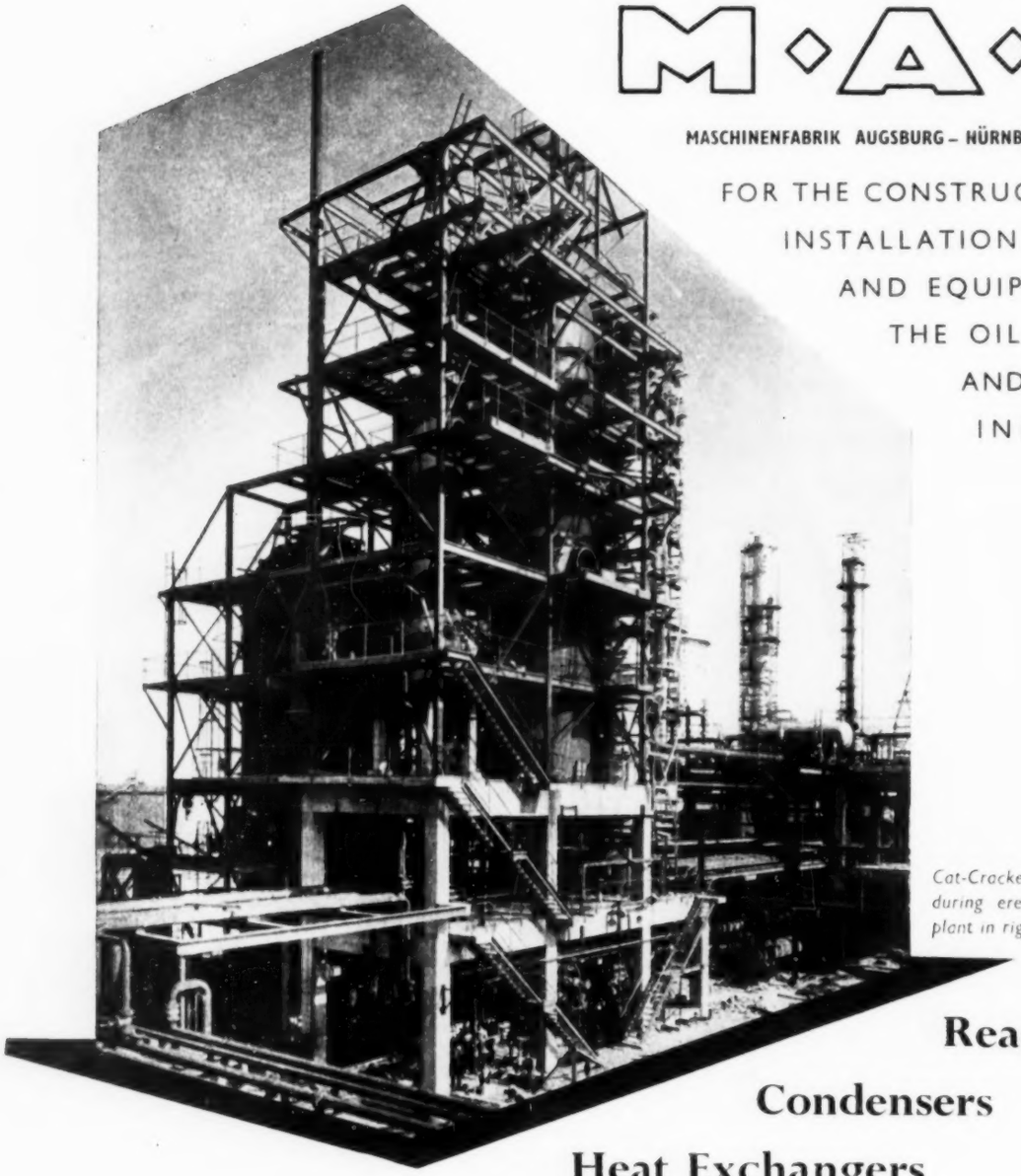

Cat-Cracker Deutsche Shell AG. during erection. Gas recovery plant in right background.

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UNITED KINGDOM *(continued)*

UNITED KINGDOM — Value of Petroleum and Petroleum Products Imported, by Country of Consignment, 1958

Country of Consignment	Thousands of Pounds Sterling
Aden	5,248
Bahrain, Qatar, and Trucial States	16,797
Kuwait	132,338
India	554
Sarawak	2,166
Canada	571
Trinidad	17,096
Other Commonwealth Countries and Irish Republic	1,860
Soviet Union	704
Western Germany	1,055
Netherlands	31,445
Belgium	945
France	5,889
Italy	4,206
Netherland Antilles	23,305
Saudi Arabia	7,423
Iraq	47,779
Iran	49,928
Indonesia	601
United States	18,579
Colombia	2,676
Venezuela	57,489
Peru	1,273
Other countries	3,800
Total	433,727

Source: Accounts Relating to the Trade and Navigation of the United Kingdom.

troleum has started building a 5.0 mm metric-ton-per-year (100,000 b/d) refinery and a 3,500-ft jetty to take up to 100,000-ton tankers. The cost is put at £18 million to £20 million; and this plant, together with Fawley—recently expanded to 210,000 b/d from 150,000 b/d—will be capable of meeting some 37% of anticipated UK domestic consumption at that time.

A new petrochemical plant by Esso, at Fawley, will produce about 40,000 tons per year of ethylene, 42,000 tons of butadiene, and 18,000 tons of pentenes. Production of sulfur at Fawley will be raised to 28,000 tons per year.

UNITED KINGDOM — Monthly Average Deliveries into Consumption of Motor Spirit; Gas-Diesel and Fuel Oils

	1958 (Thousands of Long Tons)	1957
MOTOR SPIRIT —		
Dealers:		
Premium	295.1*	234.3
Regular	134.4*	123.9
COMMERCIAL USERS:		
Premium	30.0*	22.9
Regular	99.9*	97.6
Public Electric Generation	193.9*	53.5
Steel Manufacture	144.5*	135.0
Other Industrial	321.0*	251.3
Central Heating	140.7*	108.2
Total Burning	806.2*	553.2
FOR POWER:		
Agriculture	38.4*	31.4
Marine Craft	78.1*	71.7
Gas Making	53.8*	37.1
Total Power	188.7*	162.6

*January to October only.

OIL LAWS*

Controlling Statutes:* Exploration and production in the United Kingdom are governed by the Petroleum (Production) Act, 1934; the Petroleum (Production) Regulations, 1935; the Petroleum (Production) Amendment Regulations, 1954; and the Petroleum (Production) (Amendment) Regulations, 1957. The Mines (Working Facilities and Support) Act, 1923, and the Gas Act, 1948, also apply. The Oil in Navigable Waters (Exceptions and Exemptions) Regulations, 1958, was published as S.I. 1958 No. 1060. It came into operation on July 26, and re-enacts with amendments the Oil in Navigable Waters (Exceptions and Exemptions) Regulations, 1956.

Ownership of unextracted petroleum is vested in the crown. The regulatory agency is the Ministry of Power, to which all applications for oil rights must be made. The legislation does not extend to Northern Ireland. The position there is regulated by the United Kingdom Petroleum (Production) Act, 1918; the Petroleum (Consolidation) Act (Northern Ireland), 1929; and the Petroleum (Transfer of Licenses) Act (Northern Ireland) 1937. END

*Copies of legislation cited are kept on file at the New York offices of *World Petroleum Report*, where they may be freely consulted (see p. 22 herein).

YUGOSLAVIA

PHYSICAL DEVELOPMENT

EXPLORATION: Until the end of World War II, Yugoslavia had virtually no oil industry, although the history of oil finding goes back to 1850. First exploration took place north of the Sava and Danube Rivers; but, until the end of 1934, work proceeded primarily in mining and the drilling of seismic shot holes. With the advent of rotary drilling around 1934, the oil search intensified, especially in Bosnia; but, because of primitive development methods within the country and lack of foreign capital, oil output remained insignificant.

Up to the beginning of World War II, crude production totaled less than 20,000 tons. In 1939, it amounted to only 1,122 tons (about 23 b/d). With outmoded plants, oil refining also was in its earliest stages, amounting in 1939 to less than 100,000 tons (about 2,000 b/d).

Despite the lack of modern drilling and geophysical equipment and experienced workers, fair results were obtained up to 1950. Oil-bearing deposits were found near Sumecane in Croatia, and a natural-gas field was discovered near Velika Greda in Serbia; but oil reserves were not exploited. After 1950, with acquisition of more up-to-date equipment (quite a lot of which is now manufactured in Yugoslavia), important searches began. New oil wells were located in Croatia, Serbia, and Slovenia. Rich oil layers were uncovered in the Panonia basin. In a 60,000-square-kilometer area, more than a hundred possible oil and gas beds were located —with intensified search to come in the future.

RESERVES: At the same time, proved reserves of oil and gas were increased. By the end of 1956, oil reserves amounted to seven million tons (about 52.5 million barrels), and natural-gas reserves to 380 million cubic meters.

PRODUCTION: Paralleling increased exploration was a rise in oil and gas output. Whereas in 1946 oil production amounted to 28,835 tons (about 576 b/d) and natural-gas production to 8,501,000 cubic meters, by 1956 oil production had trebled to 293,679 tons (somewhat less than 6,000 b/d), or 300 times the prewar rate; and natural-gas production had risen to 68,649,000 cubic meters—about eight times the 1946 rate and nearly 25 times the prewar level.

Domestic oil production was insufficient for the country's needs, and large quantities had to be imported. Increased home consumption was linked with Yugoslavia's economic growth and rising use of oil for communications and industry. Oil consumption in 1956 was 4.3 times that in 1939, and 3.5 times that in 1946—with principal increased use represented by fuel oil, gas oil, and automotive gasoline, so that in that year 600,000 tons of oil (12,000 b/d) still had to be imported. Domestic production in 1956 supplied only 37.7% of consumption; the remaining 62.3% was supplied by imported crude.

Oil production in 1958 is estimated to have reached 450,000 tons (9,000 b/d); natural-gas production somewhat higher than in the previous year; and refining at about 1,100,000 tons (22,000 b/d). New oil fields were discovered in the provinces of Croatia, Serbia, and Slovenia. The notable discovery of the Strumac field in Croatia is rated Yugoslavia's largest oil field to date. During the year oil exploration also was intensified.

Production in 1959 should rise to 570,000 tons (about 11,400 b/d), and some 1,170,000 tons of oil (21,400 b/d) should be refined—an overall increase of 18% over 1958. Prospects for the future of Yugoslavia's oil industry are bright, especially in view of its rich reserves of oil and natural gas which should be developed.

REFINING: Yugoslavian refining capacity is now about one million tons per year (20,000 b/d). The largest refineries are located at Sisak and Rijeka in Croatia and at Bosanski-Brod in Bosnia-Herzegovina. Investment in refinery modernization and construction up to 1956 amounted to 17.5 billion dinars. In addition, topping or skimming plants with a capacity of 365,000 tons were built.

Oil refined in 1957 totaled 1,035,691 tons (about 20,700 b/d)—80,000 tons over the target for the year and 150,000 tons more than in 1956. These results were attained because of exploitation of new oil-bearing fields and increased refinery capacity.

OIL PLANNING: The Seven-Year Plan (1957-1961) for Yugoslavian economic development was adopted by the Yugoslavian national assembly in December 1957. It provides for considerable increases within the oil industry. Production of crude in 1961 should rise to 850,000 tons (about 17,000 b/d), about three times the 1956 rate—with planned production of natural gas of 350 million cubic meters, five times more than in 1956. Oil refining should rise by 1961 to 1,350,000 tons (27,000 b/d), an increase of 460,000 tons over 1956. To provide for these production and refining gains, a large investment in new pipelines has also been budgeted. By 1965, oil production should rise to 8,120,000 tons (more than 160,000 b/d); natural gas and methane production to 3,220,000,000 cubic meters; and butane-propane to 108,000 tons. Oil reserves are expected to rise to 20,300,000 tons by the end of 1965, and natural-gas reserves to 12 billion cubic meters. In view of accomplishments to the present time, these targets should be attained or surpassed. END

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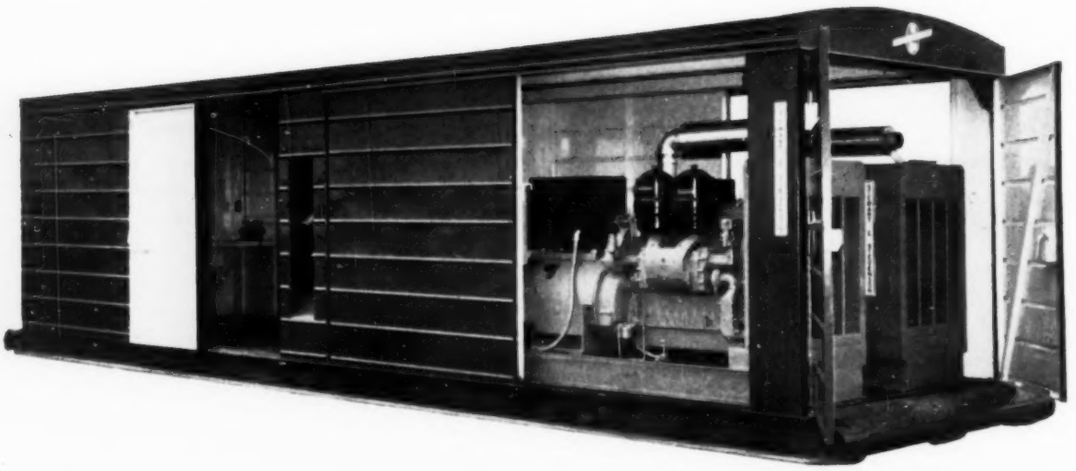

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NORTH AFRICA

PHYSICAL DEVELOPMENT

EXPLORATION: Discoveries were made during 1958 in Algeria, Libya, Egypt, and Nigeria. During the year, a law was passed to permit oil exploration in the French Sahara by international capital, and this will bring renewed activity. The Spanish Sahara also opened up, and this geological unknown will shortly be under investigation.

Many areas of Africa are not considered attractive for petroleum production, as indicated on the map (see map in *World Petroleum Report—1958*, p. 222), but exploration in known favorable regions is actively being pushed.

PRODUCTION: Africa's production during 1958 rose sharply to about 24,200 b/d, almost 40% over 1957. The increase was due mainly to the new field at Hassi Messaoud coming into production, although Egypt and Nigeria contributed in 1958 as well—Nigeria for the first time.

TRANSPORTATION: There are no large crude pipelines in Africa now, but one is under construction at present in Algeria, and another is planned soon. An intercontinental gas pipeline from Algeria to Europe is also being considered, but cost may permanently shelve this project.

There are no products pipelines of importance.

REFINING: There are refineries only in Egypt and South Africa, with a small topping plant in Morocco. A new refinery is planned in South Africa, however, and a 40,000 b/d plant in Algeria. Refining capacity for the continent as a whole was 27,400 b/d during 1958.

CONSUMPTION: Africa declined slightly in use of oil products in 1958, to about 452,200 b/d of crude-equivalent, one of the lowest per-capita rates in the world, since Africa's population is estimated in excess of 240 million. Most of Africa's consumption is imported, chiefly from the Middle East. There are some minor exports of crude—with Egypt sending some of her production to Italy; the crude from Algeria and Gabon going to France; and Nigerian crude being exported to The Netherlands. These are small amounts at present, although Algerian exports will soon reach major proportions.

AFRICA—Estimated Inland Commercial Energy Consumption, 1948-1955
(Thousands of Metric Tons of Coal-Equivalent)

Year	Petroleum Fuels	Coal and Lignite	Hydroelectricity	Total
1948	9,393	26,417	684	36,494
1949	10,795	28,155	726	39,676
1950	11,948	28,678	849	41,476
1951	13,475	29,703	1,045	44,223
1952	14,385	32,865	1,054	48,304
1953	15,509	32,817	1,289	49,615
1954	16,611	33,916	1,793	52,320
1955	17,984	37,648	2,006	57,638
Average annual rate of increase 1948-55	9.7%	5.2%	16.6%	6.7%

AFRICA—Energy Consumption, 1955, and Estimates for 1965
(Millions of Tons of Coal-Equivalent)

	Petroleum Fuels	Coal and Lignite	Hydroelectricity	Total
1955	18.0	37.6	2.0	57.6
1965	36.8-42.1	56.0-60.3	7.5-10.5	100.3-112.9
Annual average increase 1955-65	7.4%-8.9%	4.1%-4.8%	14.1%-18.0%	5.7%-7.0%

The consumption of commercial energy in Africa increased at an average annual rate of 6% to 7% between 1948 and 1955. Up to 1965, energy consumption may increase at between 5¾% and 7% per annum on the average. Within this total, it is believed the average rate of growth of consumption of petroleum fuels may lie somewhere in the range of 7½% and just under 9% per annum.

OIL LAWS

CONTROLLING STATUTES: Africa is subject to an extremely diverse system of oil regulation, based on Portuguese, Spanish, French, English, Egyptian, Belgian, and even United Nations codes.

Most of these laws have been collected and translated. They are kept on file at the New York offices of *World Petroleum Legislation Report*, where they may be consulted freely (see p. 22 herein).

NATIONAL FACTORS

There are only 10 independent nations in Africa; all the rest are under control of colonial powers. There is, however, a push toward independence, and its result will determine the future political climate in Africa. At present the British colonies are being guided toward eventual self-government; French policy envisages a quite different future for its territories, viz., a devolution of control within the political organization of the French Union. The Portuguese are making little effort to grant independence, insisting that their colonies are part of the mother country, with some suggestion of a type of Portuguese union.

Belgium recently has made an effort to further the independent status of her colonies.

AFRICA—Oil Statistics, 1958
(Barrels Per Day)

Production	24,200
Refining:	
Crude charging	27,400
Cracking	13,400
Consumption	452,200

END

ALGERIA

PHYSICAL DEVELOPMENT

EXPLORATION: The big news in Algeria during 1958 was the passage, November 22, of the law unifying and clarifying legal regulations over the OCRS (Organisation Commune des Regions Sahariennes). It takes in what used to be southern Algeria, French Sudan, Niger, Chad, and the Sahara—a vast area which is now subject to a single law. With the passage of the Sahara law, negotiations for joint operation between Standard Oil Co. (New Jersey) and the French government's Cie. Française des Pétroles (CFP) were concluded (see OIL LAWS).

The importance France attaches to oil developments within the Sahara is shown by the amounts of money it is putting into them. France invested 33 billion francs in Saharan oil exploration in 1958, 33.5 billion francs for extension and development drilling, and will spend the franc equivalent of $167 on construction of pipelines by 1960.

The search for oil in Algeria and the Sahara is not very old. Historically it was when the French government's Bureau de Réchèrches de Pétrole (BRP) was formed in 1945 that large-scale operations began. BRP has formulated broad policy lines for the oil search ever since, striving to develop franc-zone sources for crude.

The first large oil find was by CREPS (Cie. de Réchèrches et d'Exploitations de Pétrole au Sahara), owned 35% by Royal Dutch-Shell group and the remainder by six French companies. As early as May 14, 1594, a gas production of 18 million cubic feet per day was found by CREPS at Berga Bg. 1. The company later found the Edjélé field (December 1955), Tiguentourine field (June 1956), Zarzaitine field (February 1958), and Oued Tahedert (Nov. 1958) (for further details see *World Petroleum Report—1958* and *World Petroleum*, September 1958).

ALGERIA — CPA Drilling 1958

Name of Well	Location	Depth (Meters)	Results
Tartrat	Tt-1	3,219 (partly drilled in 1957)	Dry
M'Kratta	Mk-1	2,130	Dry
Alennda	Aa-1	1,732	Dry
Hamra	Hr-2	2,865	Drilling. DST at 2,171-2,189. Wet gas, 150,000 cubic meters per day
Tabaloulet	Tl-1	1,973	Drilling

CREPS drilled 31 wells during 1958 in the Edjélé field, confirming an estimate of about 225 million barrels proved reserves. At Tiguentourine 8 wells drilled by CREPS in 1958 only underlined the field's complexity and the difficulty of estimating reserves. At Zarzaitine 15 wells were drilled. This field may be considerably larger than Edjélé.

CREPS may have made an important discovery in the Ordovician at Ouan Taredert in December. This structure lies 45 km south-west of Edjélé and across the Libyan border. It gave about 2,500 cubic meters of wet gas per hour from around 3,000 ft and had oil shows as well.

Pipeline: Preliminary studies of a pipeline project from Edjélé have been undertaken. It is thought the pipeline should be able to flow initially four million tons per year (35,000 b/d). 120 miles are to be laid on Algerian territory.

ALGERIA *(continued)*

The loading point is to be built close to Gabès. The total length is to be 420 miles. The output later may be increased to a maximum 56,000 b/d, using only the initial pumping station at In Amenas terminal. This output should be achieved with 24-in. buried pipe. The only minor difficulty to be faced along the proposed line is a soft sand-duned ridge in southern Tunisia. The pipeline laying is to be carried out by TRAPSA, a CREPS-CPA subsidiary.

The largest discovery to date has been by Cie Française des Pétroles (Algérie) and SN REPAL at Hassi Messaoud, in the middle of a slightly eroded plateau of flat continental beds of Mio-Pliocene formations. The pay sands, 90 to 150 meters thick, are quartziferous sandstones of Cambrio-Ordovician age, lying at an average depth of 3,330 meters, under an almost 700-meter-thick layer of saline Trias. The structure shows an unusual undisturbed stratification down to 4,000 meters, and this may indicate a large deposit. The structure is not faulted. Wells drilled 8 km and farther away from the first hole struck the producing formation at a level difference of only 20 to 30 meters. The reservoir porosity averages 3.6%, but varies largely between 4% and 14%. The computed average permeability is of 5 millidarcys; but, in one of the two blocks which form the reservoir, it reaches 15 md. At 3,330 meters, the static pressure is of 478 kg per sq cm, and the temperature 116 C.

Although its qualities may not be called excellent, the Hassi Messaoud reservoir has two major advantages: a very light type of crude, and large reserves. 15 wells were drilled in 1958 by SN REPAL and CFP(A), the operators, bringing the total to 20 producers. Four wells were actually producing a total of about 12,000 b/d in February 1959.

Characteristics of Hassi-Messaoud crude oil are: Type, intermediate; gravity, 41.1 API; sulfur, 0.16% by weight; Saybolt Universal viscosity at 100 F, 34 sec; Reid vapor pressure, 2.4 lb; light-naphtha (debutanized) yield, 4.9% by volume; heavy-naphtha (at 180 F to 330 F), 24.7%; heavy (330 F to 380 F), 8.2%; kerosine (at 330 F to 500 F) yield, 24.8%; gas oil, 24.6%; residuals at 747 F and over, 20.5%.

Reserves: There are several estimates of the Hassi Messaoud reserve. The last official estimate runs as high as 500 million tons of proved reserves of recoverable oil (about 3.5 billion barrels). The 20 wells drilled up to now on a surface of some 500 sq km do not yield enough information to appraise the size of the basin, its reserves, and the recovery rate. However, the calm sedimentation of the area drilled up to now, and the fact that the basement has not been hit as yet, indicate a very large oil deposit. In January 1959, SN REPAL made a discovery at Bordj-Nili No. 2, 50 km north, which may raise reserve estimates by 50%.

Present production is limited to the transportation capacity of the Touggourt-Philippeville railroad, and the majority of the wells are shut off. When the field is fully developed, the yield per well is expected to vary between a minimum 175 to a maximum 750 tons per day, provided the bottom-hole pressure is maintained at 204 kg per sq cm. The gas-oil ratio is of 250 cubic meters per ton of crude surfaced, but the gas is not recovered.

Natural Gas: Enormous quantities of natural gas have been found. In March 1954, CREPS discovered the Djebel Berga structure where reserves are estimated at 60 billion cubic feet. In November 1956, SN REPAL found gas at Hassi R'Mel, just over 400 km south of Algiers. The discovery well, Hassi R'Mel-1, was located on a large uplift. Between 6,995 ft and 7,280 ft, the well drilled through 154 ft net thickness of wet-gas-bearing sandstones of lower Triassic and upper Ordovician age. The well's potential is 18 mmcf per day. The gas reserve is estimated at 3,500 billion cubic feet.

During 1958, a number of American companies entered the Sahara. They included Sinclair Oil Corp.; Phillips Petroleum Co.; Cities Service Oil Co.; Newmont Mining Co.; Pan American International Oil Co. (affiliate of Standard of Indiana); and a number of independents through Canadian Delhi.

Canadian Delhi Oil Ltd. has organized and established a wholly owned French subsidiary, Franco-Delhi SA (Frandel), Paris, France. This French subsidiary, with Canadian Delhi as guarantor, has formed a syndicate with the following French, Canadian, and American companies and individuals, with interests as indicated:

	Per Cent
Franco-Delhi SA	20.09
C. W. Murchison	9.80
E. Constantin, Jr.	5.88
Allen and Co.	7.10
Vaughn Bros.	3.43
Home Oil Co. Ltd.	2.70
Petropar	35.00
Francarep	16.00
	100.00

Two West German companies and Coporex (owned by Suez Canal Co.) also applied for permits. Their partners are Lazard Freres et Cie., French bankers; Ste. Française de Réchèrches de Pétrole, a subsidiary of Bureau de Réchèrches de Pétrole; and l'Omnium de Valeurs Agricoles Industriales et Minières, a mining investment company. An Italian company, Ausonia Mineraria, has also applied.

Reserves: Gas reserves at Hassi R'Mel are estimated by SN REPAL at eleven trillion cubic feet.

For estimates of Edjélé and Hassi Messaoud, see the previous discussion. Total Saharan reserves are not known as yet.

PRODUCTION: The Oued Gueterini field in northern Algeria has been virtually exhausted.

In 1958, the first consignment of Sahara oil arrived from Hassi Messaoud at the port of Philippeville via a 6-in. 200-km pipeline to Touggourt, and thence 400 km by rail. Despite obstacles, the flow has been increasing; production averaged 9,270 b/d in 1958. The crude is being sent to France; and CFP posted a price at Philippeville, effective September 1, 1958, of $2.90 per barrel of 40 API crude and above, compared with $2.49 for 36-36.9 API Iraq crude ex Tripoli and Banias.

Preparation for commercial production at Edjélé has begun. Thirty-five wells now producing light oil would have to be upped to 200 and doubled within five years to maintain annual output of two million tons (40,000 b/d). There is no production as yet from Edjélé except for use as diesel fuel for vehicles and drilling rigs.

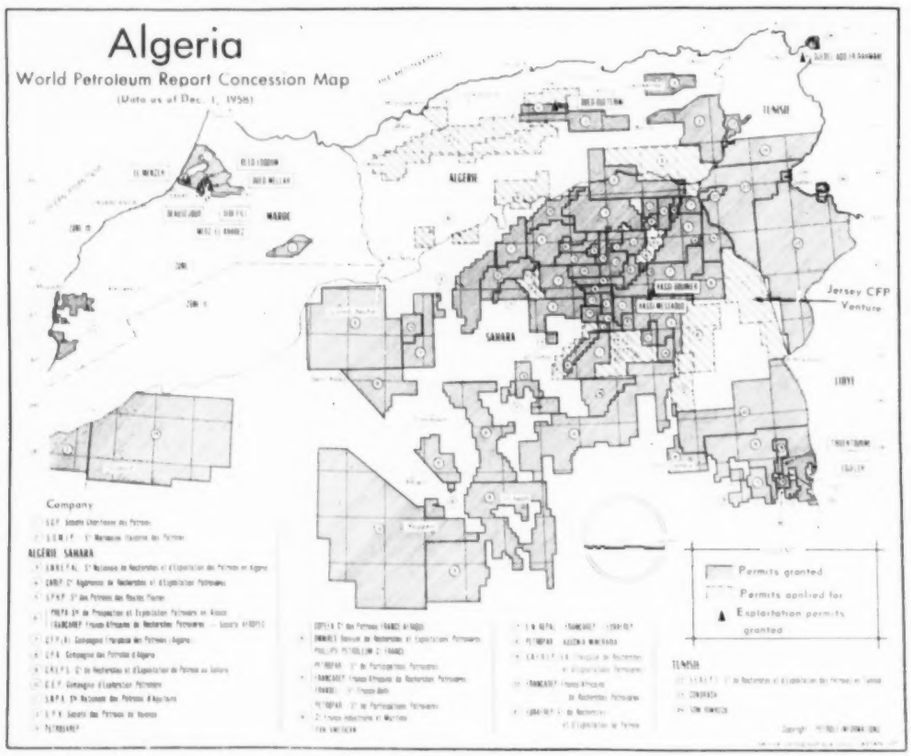
French sources estimate future Algerian production as follows:

Year	*Production* (Barrels Per Day)
1959	34,000
1960	174,000
1961	320,000
1962	360,000

Estimated savings to France, using a value of $10 per ton, are as given in table entitled "Net Cost in Foreign Currencies"—again using French estimates:

TRANSPORTATION: There are two large pipeline projects under way at present. From Hassi Messaoud, pipe-laying operations began for a 22-in. to 24-in. line to Bougie on the Mediterranean coast. It would carry about 80,000 b/d during 1960 (around four million tons per year), rising in 1964 to around 280,000 b/d. The French anticipate about 160,000 b/d arriving at the Mediterranean from Algeria by 1960, and about 500,000 b/d to 600,000 arriving by about 1965.

(continued)



From the Edjélé field, TRAPSA (French company) plans a pipeline, as previously covered.

At Hassi Messaoud, SN REPAL and CFP (A) signed, in June 1951, an agreement to share any expenses and any production on their contiguous exploration permit areas. Hassi Messaoud wells are deep—between 10,800 ft and 12,800 ft—and drilling costs are correspondingly high.

A $600 million plan has been put forward by Maurice Lemaire of France for construction of a 36-in. to 40-in. high-pressure gas pipeline from Hassi Messaoud field to Hassi R'Mel gas field and then to Algiers or some other point on the Algerian coast and across the Mediterranean, possibly via Gibraltar. The line would deliver to major European countries. Costs have been estimated at from 4.40 francs per cubic meter in France to about 6.50 francs (about 43¢ per mcf) in London, England. French government approval has not been received.

REFINING: There is no refining in Algeria at present; however, in 1958, marketing companies in Algeria had just set up a joint company, Ste. de la Raffinérie d'Alger, with a capital of 1,000 million francs—subscribed, percentagewise, as follows: Cie. Française des Pétroles 23.8; Cie. Française de Raffinage 14; Shell Algérie 21; Ste. Française des Pétroles BP 12; Jersey Standard 16.2; Beryl Algérie 7; Mobil Oil Française 6. With an initial capacity of 50,000 b d (two million tons per year), the refinery is due for completion by year-end 1959 or early in 1960. Location will be at Maison Carrée, near Algiers.

There will be no lack of outlets for good quality crude lying so near European consuming areas. However, the refinery yield pattern of the light Saharan crude is different from the pattern of French consumption with its strong emphasis on black oils; therefore, it is expected some Middle East crude will continue to be imported into France, while some Saharan oil will be exported to other nearby markets.

MARKETING: Local consumption in Algeria amounted to about 33,400 b d in 1958 (crude-equivalent basis). It was all supplied by imports, since there are no refining facilities within the country.

OIL LAWS*

The principal news of the year was the passage of the new law governing oil operations in the Sahara. Provisions of the new law are summarized separately in this report. Its guarantee of 25 years without substantial tax change has been the principal point criticized in the law as not being long enough.

The new law does not specify the amount of foreign ownership which will be permitted; however, this also was true of the former governing oil legislation; and, in view of the strict governmental control which is exercised through other provisions of the law, the amount of government participation becomes less important. Even if the operating company were 100% privately owned, it would not have full control over its work and expenditures.

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

During 1958, an agreement was reached between Tunisia and France for laying of the 700-km pipeline from the Edjélé discovery (and Zarzaitine and El Adeb Larache as well) through Tunisian territory to the vicinity of Gabès. The agreement was bitterly opposed by the Algerian nationalists (FLN).

On November 22, 1958, three basic laws were promulgated covering the OCRS (Organisation Commune des Régions Sahariennes), which includes the Saharan portion of Algeria and neighboring French territories. The laws are Ordinances 58-111, 58-112, and 58-113 which govern exploration, exploitation, and transportation by pipeline of liquid or gaseous hydrocarbons within the OCRS area.

FRENCH SAHARA LAW (OCRS)

EXPLORATION: Reconnaissance and exploration may only be carried out by the holder of Reconnaissance Authorization or a Permit H (Art. 1). (All references to articles refer to articles in Ordinance 58-111 unless otherwise specified.) The Reconnaissance Authorization conveys a nonexclusive right, excluding exploratory drilling (Art. 2). The Permit H conveys exclusive right including right to dispose of all oil or gas discovered (Art. 3). Holders may provide for participation by other parties (Art. 5). All such arrangements are subject to government approval (Art. 5). **Financial and Technical:** Permit H holder must possess adequate technical and financial qualifications and consent to minimum investment (Art. 6). **Discovery:** On discovery, must define field and and must apply for exploitation concession (Art. 7). **Duration:** Five years maximum (Art. 4). Extended twice (on the government's discretion) up to five years maximum each renewal, subject to area reduction by one-half of the original area on the first renewal and one-fourth on second renewal (Art. 8). If has complied with obligations and minimum investment has "legal right" to extension of three years or equal to the original duration of permit, if less than three years (Art. 8).
Cancellation: Cancelled if fails to comply with ordinance (Art. 12). **Transfer:** Must be authorized by government. **Surrender:** May be surrendered in whole or in part only after government consents (Art. 16).

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

EXPLOITATION: May take place only under concession or under temporary permit to exploit (Art. 18); the latter granted for two years on request (Art. 19). Conveys no right to the subsoil (Art. 20). **Area:** To be determined in the concession text (Art. 29). **Conversion:** The permittee has "the right" to concessions over oil or gas wells discovered (Art. 23). Where discoverer does not obtain a concession, has right to an indemnity (Art. 24). **Duration:** 50 years (Art. 28). **Supply of Franc Zone:** Producers required to supply the Franc Zone, after having met the interior oil needs of the OCRS (Art. 32). **Transfer:** Subject to government approval. **Surrender:** All or part, subject to governmental approval (Art. 36). Surrendered concessions put up for auction (Art. 39). **Expiration:** On expiration, the concession area available for bidding (Art. 40). Any disputes settled by the French Council of State (Art. 41). Concession gives right to transport (Art. 42). Right of easement granted (Art. 46). **Pipelines:** Considered a public utility (Art. 47). Tariffs subject to control of the government (Art. 50). **Royalty:** 12½% on liquid hydrocarbons, 5% on natural gas (Art. 63). Excludes oil or gas consumed in operations, reinjected or not used (Art. 63). Payable in kind or in cash. Lower royalty to companies undertaking difficult areas. All companies are subject to an income tax (Art. 64). **Depletion Allowance:** 27.5% of the value of production up to 50% of net income (Art. 64). Subject to income tax if not reinvested or distributed within five years (Art. 66). **Income Tax:** 50% on net income of producing and transporting companies (Art. 65). **Customs Duties:** Imports of machinery and equipment free of any tax or duty (Art. 67). **Tax Limitation:** Terms of concession granted under this law may not be changed for a period of 25 years from date of the exploitation concessions granted. **Exchange Guarantee:** Guaranteed right to transfer to home country profits and capital.

NATIONAL FACTORS

Despite the results of the referendum which indicated overwhelming acceptance of General de Gaulle's new constitution, the political future of the Sahara is not clear. The formation of a government by the nationalists outside of Algeria is being countered by the French through creation, January 12, 1957, of the Common Organization for the Saharan Regions (OCRS) which splits off southern Algeria and makes it part of the Southern Territories—including the French Sudan, Niger, Chad, and the Sahara. Algeria has been divided in two for administrative purposes since 1902, and the French have lately been emphasizing the division. The northern part, or Algeria proper, covers an area of about 210,000 sq km; has a population of over nine million; and is now administered as 12 "départements." It has been an integral part of France since 1881. The vast Southern Territories, with two "départements" (Saoura and Oasis) have an area not far short of two million kilometers but a population of little more than 500,000. Since 1902, they have been in the nature of a colony administered from Algiers.

The political division of the country was further emphasized by the so-called "loi-cadre" which passed the French National Assembly, January 31, 1958. This envisaged a federal system of government for Algeria proper; but, in view of the revolt of May 13 and the demise of the Fourth Republic, the law is in fact a dead letter.

END

FRENCH CRUDE SUPPLY

Net Cost in Foreign Currencies

Year	Crude Consumption[1]	Production of "Franc" Zone	Without "Franc" Zone Production	With "Franc" Zone Production	Economies Obtained by "Franc" Zone Production
1958	27	2	310	290	20
1961	30	18	350	120	230
1965	40	28	460	120	340

[1]Millions of tons.

[2]Millions of dollars.

EGYPT

PHYSICAL DEVELOPMENT

EXPLORATION: The first major exploratory effort in the country, by Sahara Petroleum Co., was suspended in 1958. As of December 16, 1958, the government had not accepted the concession's relinquishment but is expected to soon. The nine dry wildcat wells drilled by Sahara are shown on the accompanying map.

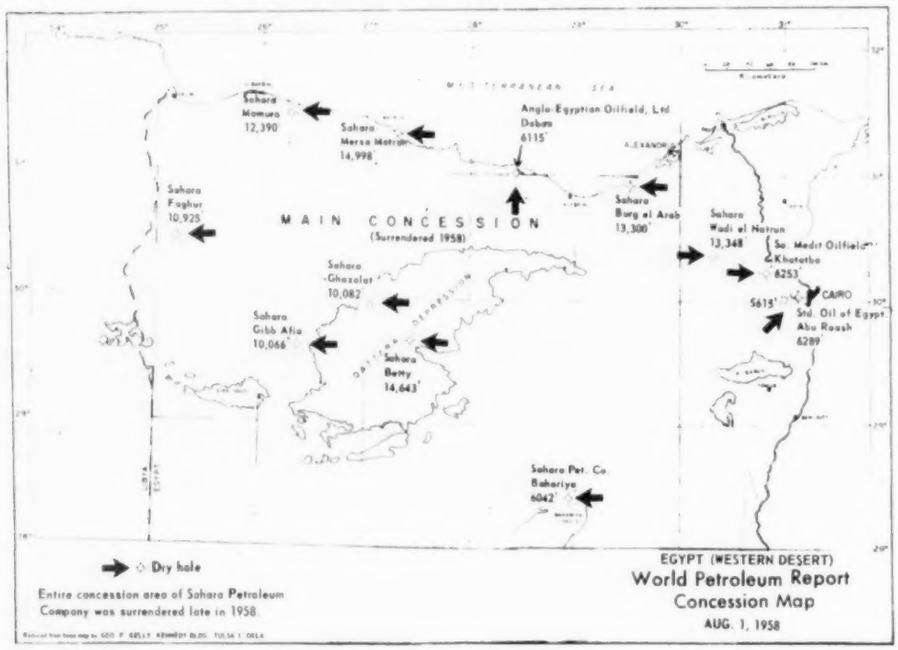
Shaw Oil Co., a Dallas, Texas, independent producer, and African Oil Fields, a local Egyptian company, have bid on concession areas in parts of the Sinai peninsula and Red Sea coastal area. Terms reportedly are similar to those of the Sahara Petroleum Co. concession referred to above.

Arabian Oil Co., owned by Japanese interests, is reported negotiating for a concession which would lie along Egypt's Red Sea coast. The proposal calls for a $4.8 million investment in exploration and drilling costs.

During the Suez crisis, the Anglo Egyptian Oil Co. (AEO), a UK-registered company with management in Cairo, was sequestered by the government. It is owned 31% each by Shell and BP, 10% by the Egyptian government, and 28% by various stockholders. The old Sudr, Asl, and Ras Matarma fields belong jointly to AEO and Mobil of Egypt. Production is divided 50-50 in this "Sinai pool" arrangement. According to Mobil, it has worked satisfactorily—although AEO was run by the government.

During December 1958, a settlement was announced which would return the company's properties and grant a new concession holding. It will take effect when there is a settlement of financial issues between Britain and Egypt. Details of the agreement were not released.

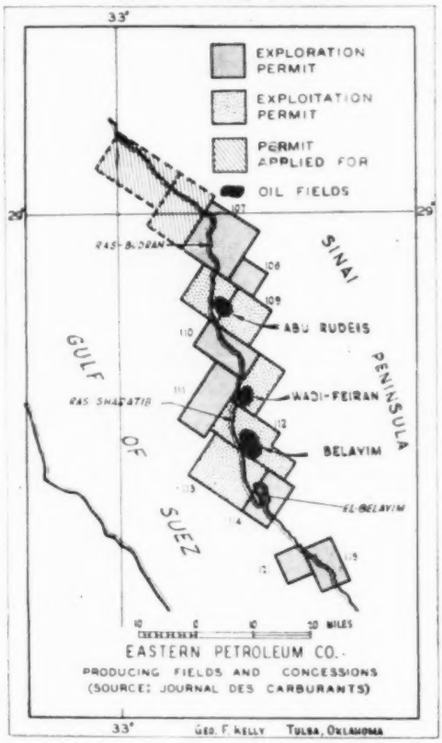
The successor to the National Petroleum Co. of Egypt, Eastern Petroleum Co. (also known as Cie. Orientale des Pétroles d'Egypte) was organized in 1957 and is owned 51% by International Egyptian Oil Co. (Petrofina AGIP); General Petroleum Authority, 29%; and Cooperative Socy. for Petroleum, 20%. It has increased its production sharply, and holds three fields—Belayim, Feiran, and Abu Rudeis. It drilled nine wells in Egypt during 1957, of which two have been abandoned and seven are reported producing. Six were in the Belayim field, one of which was abandoned. Two were in the Abu Rudeis field. And one, abandoned, was in Ekma field. During 1958, the company received 13 new concessions in the Sinai area and offshore in the Red Sea.



Government Exploration: Egypt and Syria have united to form the United Arab Republic and, by Decree of September 28, set up a "General Petroleum Authority" to plan UAR oil policy. Headquarters are in Cairo, with subsidiary departments for Egypt and Syria. All negotiations will go through it—including oil pipelines, imports and exports, prices of oil products, and exploration activities. It also conducts exploration, refining, or other oil operations, and has authority to buy, incorporate, and annex public or private oil organizations.

One of the government's first moves was to set up The General Petroleum Co., which was granted 61 exploration concessions indicated on the accompanying maps, and on which private companies have had application for many years.

Egypt
World Petroleum Report Concession Map
(Data as of Sept., 1958)



A well spudded in the Gharb Gharib region, on July 28, 1958, was successful. It came in at 2,800 ft with a reported flow of 800 b/d to 2,000 b/d. The discovery reportedly extends offshore, and the company is now awaiting German and Soviet equipment—including four turbodrills—to continue development. Expenditure by the company was about $2.5 million in 1958, according to the company.

Wells near the Ras Gharib field were also reported discoveries by the company during 1958.

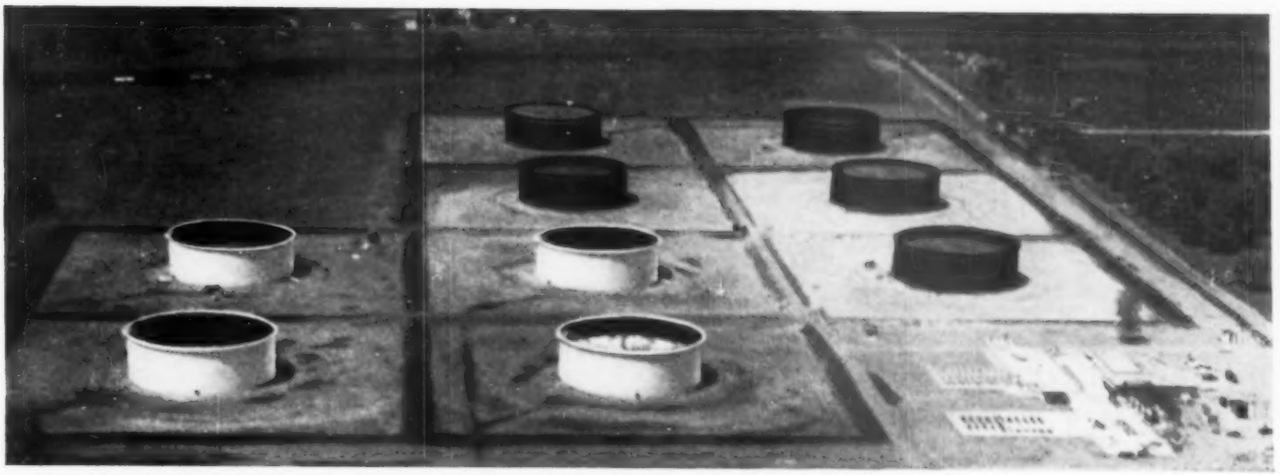
During November, the UAR announced plans to spend $206 million on oil projects, of which

(continued)

EGYPT — Production by Fields, 1958
(Barrels)

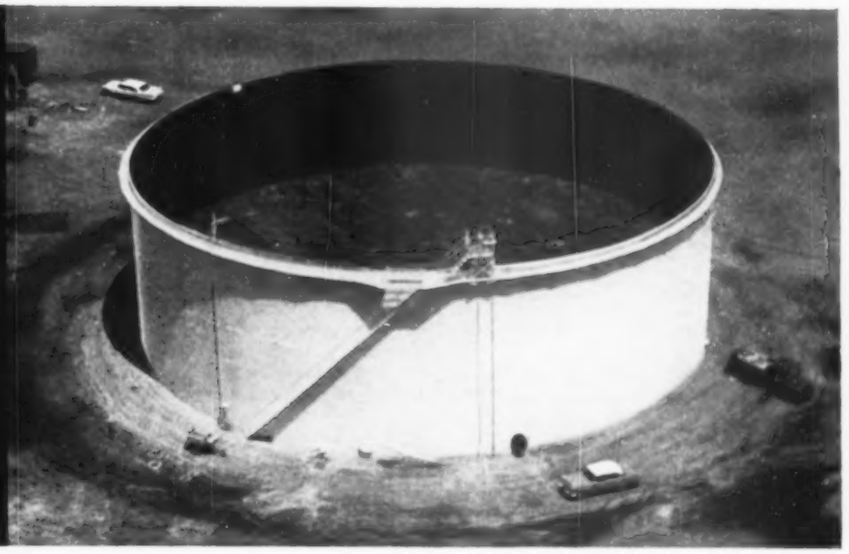
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	FORECAST 4th Quarter
Surd	175,196	157,421	132,922	81,233	93,385	90,076	93,114	92,359	90,718	
Asl	72,691	67,609	78,226	81,233	86,296	92,381	95,869	97,228	93,372	529,000, or 176,333 per mo.
Ras Matar	7,340	9,781	6,818	6,372	5,208	5,277	7,126	5,931	7,523	
Ras Gharib	636,245	575,265	638,924	619,237	628,710	587,631	604,965	612,966	581,152	1,819,760, or 606,587 per mo.
Hurghada	19,159	16,662	17,562	15,819	18,272	18,788	19,134	20,190	19,656	
Belayim	741,920	682,129	543,967	708,615	697,432	870,389	911,443	816,196	894,831	
Feiran	10,567	8,434	10,441	9,793	9,925	9,454	10,399	9,579	10,089	3,312,000, or 1,104,000 per mo.
Rudeis	195,273	168,504	133,054	161,044	203,745	266,518	283,546	274,535	262,014	
Total	1,858,391	1,685,805	1,561,914	1,690,566	1,742,973	1,940,524	2,025,596	1,928,684	1,959,355	5,660,760

16,393,808 to Sept. 30 (60,051 b/d)
22,054,568 for year 1958 (60,423 b/d)



AGAIN... EXPERIENCE PAYS OFF HANDSOMELY

9



new double-deck floating roof tanks for TECUMSEH PIPE LINE

The new Hartsdale Station at Schererville, Ind., stores crude on a standby basis for transmission to Cygnet, Ohio, through the 20″ Tecumseh Pipe Line. Nine Graver Double-Deck Floating Roof Tanks, with the effective patented Graver Vapor-Stop Seal, were selected to handle a large part of the tremendous storage requirements. The nine Graver tanks will hold 900,000 bbls. of crude. Each is 134′ in diameter by 43′ high, with a capacity of 100,000 bbls.

Operated by Sinclair Pipe Line Company for itself and co-owners Ashland Oil & Refining Company and The Pure Oil Company, the new storage depot is one of many where Graver floating roof tanks have been installed over the years. Graver's long experience in fabricating and erecting conservation tankage pays off handsomely when Graver Double- or Single-Deck Floating Roof Tanks are specified. Trouble-free operation and long life are understandably inherent in Graver designs.

Plants and Offices Across America

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GRAVER TANK & MFG. CO.
DIVISION—UNION TANK CAR COMPANY
EAST CHICAGO, IND.

EGYPT *(continued)*

$130 million will be spent in Egypt under recent agreements for aid with Russia and Germany. The projects include: (1) $18 million for exploration, drilling, and oil-field development; (2) $13.5 million for expansion of the government's 28,000 b/d refinery at Suez (when completed, it will have a new 20,000 b/d primary distillation unit, a 3,200 b/d lube-oil plant, and a gas-separation plant); (3) $3 million for expansion of the new 4,200 b/d refinery at Mex, near Alexandria; (4) $13.5 million for a pipeline network from the oil-producing areas along both sides of the Red Sea coast to the refineries at Suez; (5) $4.5 million for oil jetties at Suez and on the Nile River; (6) $7 million for tankers; (7) $6 million for tank farms; (8) $27 million for a petrochemical industry, to be partly financed by the Soviet loan (this will include a $9-million polyethylene plant); (9) $30 million for a coking plant; (10) $7 million for a carbon-black industry.

PRODUCTION: Levels rose sharply in 1958, up to an estimated 60,423 b/d from 45,140 b/d in 1957. Principal increase was from the Belayim field, and from the new Abu Rudeis field.

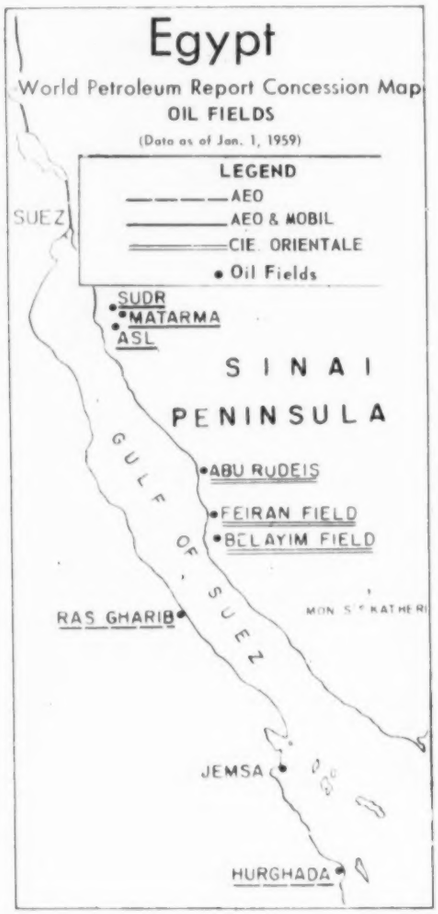
EGYPT — Imports and Exports, 1957

(Thousands of Barrels)

	Crude Petroleum	Gasoline	Kerosine	Diesel Oil	Gas Oil	Resid. Fuel Oil	Lubricating Oil	Asphalt	Total
IMPORTS FROM:									
United States	—	17	—	—	—	—	245	—	262
Netherlands Antilles	—	56	—	—	—	—	—	—	56
Venezuela	—	—	—	—	—	105	—	—	105
Italy	—	—	—	—	—	1	—	—	1
Netherlands	—	—	—	—	—	—	1	—	1
Romania	—	—	240	60	36	259	—	—	595
United Kingdom	—	—	—	—	—	10	20	—	30
USSR	1,272	28	310	—	13	405	—	—	2,028
Iran	—	1	—	—	7	47	—	—	55
Saudi Arabia	5,152	2	105	26	48	58	—	—	5,391
Syria	—	—	—	—	—	—	—	24	24
British Malaya	—	—	—	103	—	—	—	—	103
Other Asian Countries	—	34	—	—	4	2	—	—	40
Indonesia	—	—	—	24	—	—	—	—	24
Other countries	—	1	—	—	—	—	1	4	6
Total	6,424	139	655	213	108	887	267	281	8,721
EXPORTS:									
Destination unavailable	—	10	25	4	17	—	2	91	64
Bunkers	—	—	—	—	7	82	—	—	89

[1] Includes coke and pitch.

Source: American Embassy, Cairo, through the US State Department.



EGYPT — Reserves of Principal Fields

	Metric Tons
Hurghadah	300,000
Ras Gharib	14,000,000
Sadr	600,000
'Asl	150,000
Ras Matarmah	200,000
Wadi Firan	7,000,000
Bala'im (Belayim)	100,000,000

TRANSPORTATION: There are no crude pipelines of major importance. The Suez Canal, however, is of major significance; and, during 1958, agreement was reached on compensation to its former owners. Under the agreement (dated July 13, 1958), the UAR promised to pay 28.3 million Egyptian pounds ($80 million, approx.) as total compensation, payable in six annual installments.

Canal traffic has continued to rise, as accompanying tables show. During late 1958, depth permitted the transit of 35-ft-draft vessels (the prenationalization depth), and programs are now under way to raise this to 37 ft in about two years (about June 30, 1960). Soon to be under way is a "Nasser project" which will allow transit of 40-ft-draft vessels eventually, as well as modernized equipment.

Studies for a pipeline from Port Said to Suez have been completed, according to press reports, and submitted to President Nasser.

REFINING: There are three refineries (see *World Petroleum Report—1958*). According to press reports, a new 20,000 b/d refinery is to be built at Suez under the Soviet-Egyptian agreement. Also, with some West German technical assistance and equipment on credit, local refining facilities are to be expanded, with two one-million-ton crude distillation units at the government's Suez refinery, 60,000-ton-per-year lube plant at Suez, and 300,000-ton plant for high-octane gasoline and petrochemical feed stock.

MARKETING: Consumption has expanded in recent years, and is now running at about 70,000 b/d. Local production is partly exported, and an average 15,000 b/d of Sinai crude was shipped to Italy in the first quarter of 1958 by Eastern Petroleum Corp., which is partly owned by the Italian government.

OIL LAWS*

There were no developments in oil regulation during 1958. For a review of Egypt's oil laws, see *World Petroleum Report—1957*. For a review of major concession contracts, as well as a brief summary of the law, see *World Petroleum Report—1958*. Copies of the law, including translations of the major laws affecting investment and of the Conorada concession contract, are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N. Y. (see p. 22 herein).

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N. Y. (see p. 22 herein).

NATIONAL FACTORS

The principal deterrent to investment has been the government attitude as expressed in the recent nationalization of Suez. While this has been compensated now, the compensation was on the basis of stock value (in effect) as of the day before nationalization. The total compensation was about one-sixth what the company had claimed; but, whatever the merits of the case, there is little doubt the government is rapidly taking over large sectors of the economy formerly reserved to private development. A continuance of this trend is seen in the formation of the General Petroleum Authority, a description of whose statutes is contained in *World Petroleum Report—1958*. For a description of exchange restrictions, also see that report.

The outstanding political development and, in the opinion of many observers, the outgrowth of an inadequate and misguided USA policy was the offer by the Soviet Union to finance part of the Aswan dam. It was the refusal of aid for this dam which precipitated the Suez crisis, even though the nationalization move had been contemplated long before. It is the view of President Nasser that relations with the United States will not improve until Secretary Dulles is out of office, sometime in 1960. The Soviet loan was 400 million rubles, reported in the press as $100 million, but actually worth about $40 million.

A recent United Nations report attributed the Suez Canal tolls with saving Egypt from "grim" reductions in its development programs during 1958. The report pointed out that Egypt had run through most of her sterling balances (down to £66.1 million from £400 million) to be used as payment for imports. The canal proceeds are to be used to pay for the Aswan dam development project, and are estimated at about $100 million yearly.

Despite predictions to the contrary, the canal has run smoothly under the administration of Colonel Younes, director of the Suez Canal Authority. The efficiency of the operation is even reflected in the reports which come through on transits without delay, although the reports require considerable preparation and modern calculating equipment. END

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LIBYA

PHYSICAL DEVELOPMENT

EXPLORATION: Since passage of the Libyan Petroleum Law of 1955, virtually every major international oil company (and some of the smaller ones) have begun exploration in Libya (see accompanying map). With 1957 and 1958 witnessing intense geological reconnaissance and the start of drilling, oil has been encountered thus far in four of the 29 wells drilled.

December 12, 1957, marked the first oil discovery in Libya, with completion of Atshan 2 by Standard Oil Co. (Libya) Inc. in the Fezzan, near the Algerian Sahara. Bottomed at 2,960 ft, where salt water was encountered, the hole was plugged back about 200 ft for testing. When this proved negative, the well was plugged back farther for a test between 2,100 ft and 2,140 ft. This 40-ft Devonian section flowed 500 b/d of 44.5-gravity oil.

Esso previously had encountered gas in its Atshan 1, 1½ miles east on the same structure as Atshan 2. Esso's first well was Haghe 1, which was 36 miles south. Its third Atshan well was abandoned dry, and the rig moved to Tasonee, about 30 kilometers southeast of Atshan. Esso, most active company in Libya, sunk 10 wells in 1958 in Libya, and a total of 13 to Feb. 3, 1959.

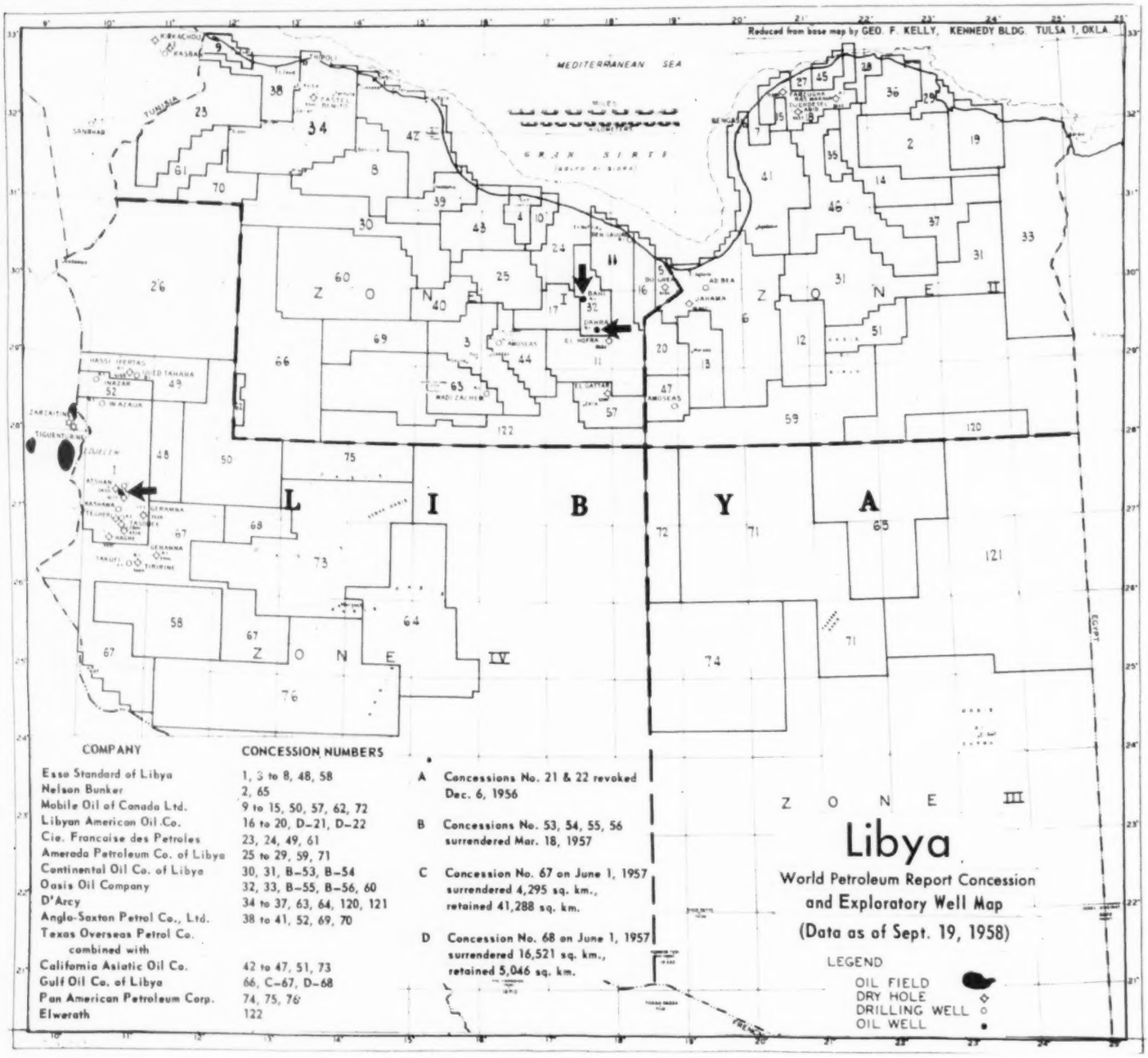
Also in the remote and arid Fezzan province, Gulf Oil of Libya, on its concession 67, abandoned two shallow tests. A third, Ubari 1, was around 5,000 ft in February of 1959.

Cie. Française des Pétroles Total (Libye) drilled its first Fezzan test, Hasi Ifertas 1, some 30 miles east of the Algerian frontier and 100 miles to the north of Asthan, on concession 49. Later in the year, it encountered oil shows at 4,600 ft in the Tournaisian (Carboniferous). To be carried to 6,000 ft, the well tested 8 bbl per hour from a 75-ft section below 4,600 ft, but later went to water.

On August 3, 1958, American Overseas Petroleum Ltd., (Amoseas), one of the Caltex group, abandoned at 3,569 ft its first exploratory well in the Fezzan, Gebel Uaddan No. 1, 330 miles southeast of Tripoli. Amoseas intends to continue its geological field work begun in Libya in 1953 and its seismic exploration begun in 1956. Scelua No. 1 is now drilling (Feb. 3) below 3,000 ft. It is 80 miles south of the coast on the Gulf of Sidra.

D'Arcy Exploration Co. (Africa) Ltd., one of British Petroleum's prospecting subsidiaries, started drilling its first deep test in Libya in

(continued)


Reduced from base map by GEO. F. KELLY, KENNEDY BLDG. TULSA 1, OKLA.
MEDITERRANEAN SEA
GRAN SIRTE
TUNISIA
ZONE II
ZONE III
ZONE IV
LIBYA
Libya
World Petroleum Report Concession and Exploratory Well Map
(Data as of Sept. 19, 1958)
LEGEND
OIL FIELD
DRY HOLE
DRILLING WELL
OIL WELL
A Concessions No. 21 & 22 revoked Dec. 6, 1956
B Concessions No. 53, 54, 55, 56 surrendered Mar. 18, 1957
C Concession No. 67 on June 1, 1957 surrendered 4,295 sq. km., retained 41,288 sq. km.
D Concession No. 68 on June 1, 1957 surrendered 16,521 sq. km., retained 5,046 sq. km.

COMPANY	CONCESSION NUMBERS
Esso Standard of Libya	1, 3 to 8, 48, 58
Nelson Bunker	2, 65
Mobile Oil of Canada Ltd.	9 to 15, 50, 57, 62, 72
Libyan American Oil Co.	16 to 20, D–21, D–22
Cie. Francaise des Petroles	23, 24, 49, 61
Amerada Petroleum Co. of Libya	25 to 29, 59, 71
Continental Oil Co. of Libya	30, 31, B–53, B–54
Oasis Oil Company	32, 33, B–55, B–56, 60
D'Arcy	34 to 37, 63, 64, 120, 121
Anglo-Saxon Petrol Co., Ltd.	38 to 41, 52, 69, 70
Texas Overseas Petrol Co. combined with	
California Asiatic Oil Co.	42 to 47, 51, 73
Gulf Oil Co. of Libya	66, C–67, D–68
Pan American Petroleum Corp.	74, 75, 76
Elwerath	122

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LIBYA ***(continued)***

January of 1958, at Castel Benito No. 1, 30 miles south of Tripoli. This followed several years of survey work by the company, which has concession areas in all three provinces, viz., Tripolitania, Cyrenaica, and the Fezzan. Castel Benito No. 1 was abandoned in June at 3,500 ft; and a second deep test was spudded at Wadi Zachem No. 1, 30 miles south of Hon and 180 miles south-southwest of Sirte.

In November of 1958, the West German firm Gewerkschaft Elwerath Crude Oil Co., of Hanover, was negotiating on a concession situated about 300 km south of Tripoli. Elwerath would be the second German company to receive an oil concession in Libya, the first having been granted to Deutsche Erdoel AG, of Hamburg, some time ago.

Anglo Saxon Petroleum (Dutch-Shell group) at mid-October 1958, on its block 52 near the Algerian border, was running casing below 8,000 ft in its first Libyan try.

In the more accessible Sirte region, close to the Mediterranean coast, Oasis Oil Co. of Libya scored two successes in 1958 on its 1¼-million-acre concession 32. In June 1958, Oasis discovered oil in its first exploratory well in North Africa, Bahi No. 1, when a drill-stem test recovered 75 bbl of 39-gravity sweet crude in 2½ hours through a ¼-in. bottom-hole choke. The interval tested was a 32-ft section between 5,822 ft and 5,854 ft. Bahi No. 1 discovery is about 75 miles south of the Gulf of Sirite. Coordinates are 29°52'27" north; 17°35'4" east. Five seismic parties are working.

Later in the year, on the south end of the same concession, Oasis brought in another wildcat. About 24 miles south of Bahi No. 1 discovery at 29°31'6" N, 17°46'5" E, No. B-1-32 Dahra stepout well flowed 38 bbl of 36-gravity crude (with no salt water) on a 75-min drill-stem test. The limestone interval tested was between 3,758 ft and 3,808 ft. The well is on the same structure. Thalith, a wildcat between the two discoveries, was dry at 5,125 ft in January, 1959, however. Oasis Oil Co., a wholly owned subsidiary of The Ohio Oil Co., is operator for Ohio Oil, Amerada Petroleum Corp., and Continental Oil Co. An additional rig was added to the company's equipment, as of fall 1958, for a total of three.

Also in the Sirite region, Esso's deep test No. 1 El Jahama was completed dry. El Bdea, Esso's third test in north-central Libya within a few miles of the Gulf of Sirte and 120 miles northeast of the two Oasis discoveries, was abandoned in early 1959 at 8,888 ft.

Mobil Oil of Canada Ltd. (operating subsidiary of Socony Mobil Oil Co. Inc.) has concentrated its deep drilling in northern Libya on adjacent blocks 11 and 57. Its latest test at Wadi ben Guaad on the Mediterranean coast was drilling below 8,600 ft in October of 1958. Block 11 surrounds Oasis's block 32 on three sides. Mobil's Hofra 1 in the 8,500-ft range had a small oil show but no commercial production. Socony's first test at El Gattar, on block 57, was abandoned dry at 6,280 ft.

No deep tests have been started on Mobil's Fezzan acreage, but a core-drilling outfit in 1957 topped a high-pressure gas zone at 1,510 ft on block 50. The daily flow of two million cubic feet had to be killed with cement. A West German refiner, Gelsenberg Benzin AG, has acquired a 25% interest in Mobil's Libyan operations.

In the Bengasi region of Cyrenaica, Libyan American drilled ahead on its third test after abandonment of two others as dry. The company, a Texas Gulf Producing Co. affiliate, went below 8,807 ft some 40 miles west of the city of Bengasi. W. R. Grace & Co. has a 49% interest in this concession. The company had no additional drill sites planned, but will continue its exploration program to determine the extent of future drilling.

Concessions in Libya totaling nearly 23 million acres have been awarded Pan American Libya Oil Co., a recently formed subsidiary of Pan American International Oil Co., affiliate of Pan American Petroleum Corp. An aerial survey was started in April 1958 by Aero Service Corp. on the two largest tracts. Pan American has three geological parties at work. In addition, it expects to have two gravity crews and one seismic party in the field during 1959.

LIBYA—ESSO EXPLORATION, 1958
(Party-Months)

Geological field	48
Gravity	9½
Seismic	33½
Core drilling	7
Wildcat drilling	24

OIL LAWS*

No changes occurred in the country's basic oil laws during 1958, except that on August 3 a petroleum royalties law was passed which provides for payment of income tax collected from oil companies within the administrative borders of each province to the province concerned—along with issuance of fees for exploration license and one-third of other fees collected by the State. Of remaining oil income, 70% is allotted to development affairs in Libya through the Development Council, with 15% to the federal government and 15% to the province within whose borders the oil was extracted. See WPR-1958 for oil law summary.

NATIONAL FACTORS

The central federal government of Libya is not strong, and the provinces have considerable independence. One result is to impede transfer of drilling and geological personnel from one province to another. The deductibility of expenditures in one province has to be carefully watched to be certain they will apply against the company's overall operations in Libya. The country's general attitude is favorable to international investment, however. END

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N. Y. (see p. 22 herein)

MOROCCO

PHYSICAL DEVELOPMENT

EXPLORATION: Exploration, which began when Ste. Chérifiènne des Pétroles (SCP) was formed in 1929, has not resulted in any major finds so far—although enough production to meet Morocco's needs has been obtained. SCP is owned by the Bureau de Réchèrches de Pétrole (39.6%) and the Moroccan government (44.4%). An initial discovery was made in 1934 in the Rides Prérifaines of the Tselfat hills, a series of outcrops parallel to the Middle Atlas Mountains, edging a secondary basin. Further discoveries were made in the same formation at Bou Draa and at Am Hamra in the coastal Rharb plain under which the basin extends. It was not until 1947-51, however, that more important strikes were made—the Baton, Mellah, Tisserand, Lower Sidi Fili, and Mers el Kharez fields—all located on the edges of primary structures, in the Oued Beth valley. There was, however, a renewal of activity in 1958, following discovery of oil at Djebel Haricha in the Rharb in March 1957, and of wet gas at Kechoula in the Mogador concession (see *Petroleum Times*, November 7, 1958).

Under the new oil law passed in 1958 (see Oil Laws section), the first actually to receive concessions was the Italian government's company, Ente Nazionali Idrocarburi (ENI) which, through its subsidiary AGIP Mineraria, formed a joint company known as SOMIP with the government. (See accompanying map for concession areas and Oil Laws section for concession details.)

Ambassador Oil Corp., an independent of Texas, applied for a permit (see map). Ste. Marocaine Allemande des Pétroles—formed jointly by German firm Wintershall AG and Tangier-based Sahara Mourakouch—applied for two tracts, one of 4,500 in central Draa River valley, the other of 10,230 square miles in zone of Taouz oasis, in the disputed southeastern border region between Morocco and Algeria. Two unidentified French companies have bid on the same acreage applied for by Ambassador. Ambassador's application is still pending, according to the company, due to political and boundary disputes. No early resolution is foreseen.

CFP (Cie. Francaise des Pétroles) holds four search licenses in the Rharb-Prérif basin, where the fields are situated; in the Moyenne Moulouya farther east; and in the Mogador and Sous zones.

Wintershall has also applied for a permit under the name of Ste. Marocaine Allemande des Pétroles in the central zone, Draa Valley. It had not been granted as of January 7, 1959.

The Spanish firm Adaro continued to conduct surface geological exploration on several structures in this area, including two diapirs located southeast of Larache. This area, received from Spain in 1958, has good prospects. Application has also been made by Catawba Corp., of New York's Buckley interests, and by Kerr-McGee Oil Industries, Inc. of Oklahoma.

The USA firm U.S. Exploration Co., formed by Frank Dills, of Denver, Colo., applied for three tracts. The French company, Prospection Minière Réchèrches Pétrolieres, has proposed two oil exploration projects in the Moroccan Meseta. *(continued)*

MOROCCO—Oil Statistics, 1958

Rotary rigs active	4
Footage drilled	66,344
Number of wells drilled	14
Number of producing wells	8
Percentage of wells successful	57
Daily production, b/d	1,532
Total production, bbl	560,550
Number of refineries	1
Cracking capacity, lb. of coke per hour	1,800

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PRODUCTION: Production has been going on for many years (the first field was found in 1918). It reached its peak in 1954, and then declined to present levels. It should pick up again soon, with the new discovery at Djebel Haricha. 1958 averaged 1,551 b/d.

Morocco's crude output dropped to 75,098 metric tons (1,500 b/d) in 1957 from 97,452 (2,000 b/d) in 1956; 102,456 tons in 1955; 117,948 tons in 1954. Producing wells totaled 94 at year-end 1957. Ste. Chérifiènne des Pétroles reported 1957 natural-gas production of 3,375,645 cubic meters; 7,304,246 in 1956.

Crude production in 1958 averaged 1,532 b/d.

Reserves: Proved recoverable crude-oil reserves were estimated at 408,000 tons (about 3,060,000 bbl), at end-1957, excluding the reserves obtainable by secondary recovery from the Bled Khatara field, which were estimated at the end of 1956 at 500,000 tons (about 3,750,000 bbl).

REFINING: There is only one refinery, owned by SCP and located at Petijean. Capacity is 2,100 b/d, with 1,800 b/d cracking capacity.

It was widely reported in the press that ENI would build a refinery through SOMIP, as part of its concession deal. That was not correct. The refinery arrangement is mentioned in the concession, but is actually a separate contract now under negotiation. AGIP has confirmed that its construction is not contingent on finding oil, and that AGIP and Morocco will share costs of the 20,000 b/d plant. AGIP has come in for considerable criticism at home for this arrangement.

MARKETING: Most consumption is supplied within the country. Imports of oil in 1957 amounted to 608,487 metric tons, valued at 12,056,619,000 francs, half of it from France. About 33,000 metric tons of crude were imported in 1957. Exports are negligible.

Under a new agreement, the USSR will deliver 637,800 bbl of crude plus 472,000 bbl of products.

OIL LAWS*

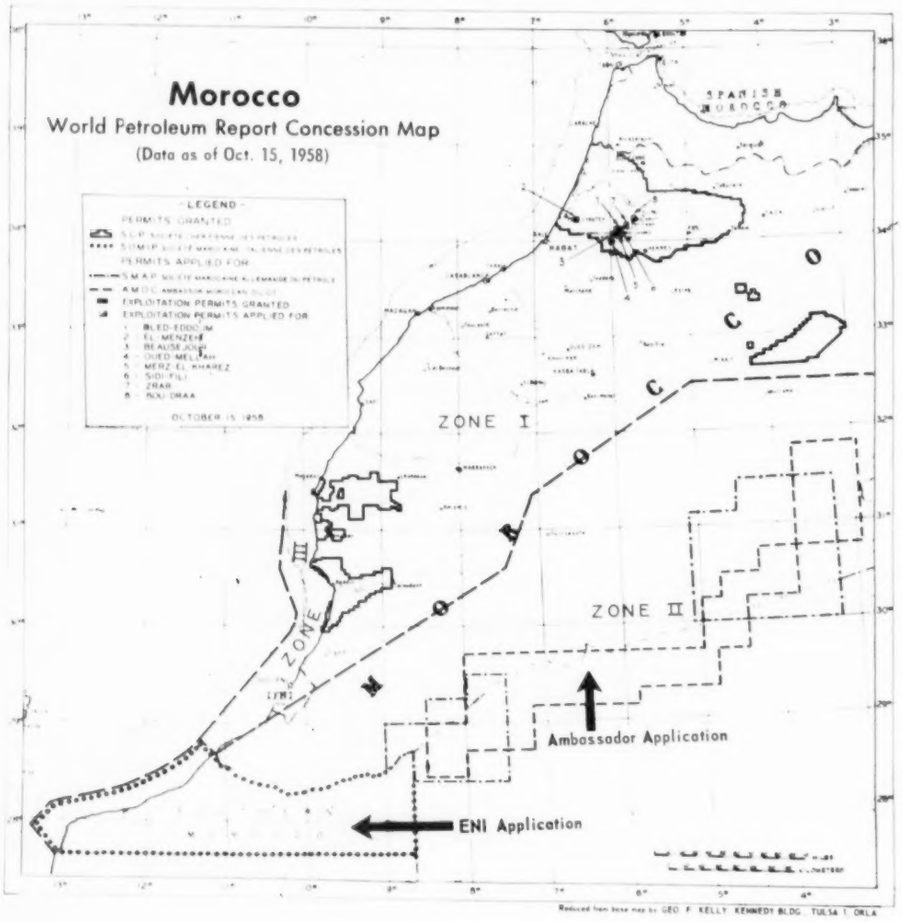
Morocco passed a new oil law in 1958 which completely revises its oil regulations. Principal controlling laws now are as follows:

Controlling Statutes*: Depletion allowance is contained in Dahir 1-58-299 of September 3, 1958. Dahir 1-58-263 contains additional inducements to investors, including refiners. Basic regulation is contained in the following: Dahir No. 1-58-229 of 4 Moharrem 1378 (July 21, 1958) amending the Dahir of 9 Rejeb 1370 (April 16, 1951) establishing mining regulations in Morocco; Dahir No. 1-58-234 of 4 Moharrem 1378 (July 21, 1958) relating to the applications in the former zone of the Spanish Protectorate of the Dahir of 9 Rejeb 1370 (April 16, 1951) establishing mine regulations; Dahir No. 1-58-228 of 6 Moharrem 1378 (July 23, 1958) supplementing the Dahir of 26 Rebia 11 1374 (December 23, 1954) establishing measures of tax relief; Decree No. 2-58-879 of 6 Moharrem 1378 (July 23, 1958) establishing the conditions for the filing and registration of applications for exploration permits, applications for the extension of exploration permits, and applications for hydrocarbon concessions; Decree No. 2-58-876 of 6 Moharrem 1378 (July 23, 1958) governing the activity of holders of hydrocarbon mine titles; Decree No. 2-58-877 of 6 Moharrem 1378 (July 23, 1958) approving the standard terms and conditions for concessions of hydrocarbon deposits; Decree No. 2-58-878 of 6 Moharrem 1378 (July 23, 1958) regulating the related activities of the holders of exploration permits and concessions for the exploitation of hydrocarbons.

Morocco's new oil law is essentially similar to the new Iranian oil law. It favors companies admitting State participation.

A resume of provisions follows. (As mentioned, the depletion allowance is not in the law, but a special fiscal law has been passed for it. It is similar to the French depletion provisions.)

*Copies and translations of the laws cited are on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).



MOROCCO—OIL LAW SUMMARY

Hydrocarbon deposits are property of the State. Country divided into three zones: Zone I (all the north down to 32°30'); Zone II (south of this); Zone III (continental shelf).

EXPLORATION: First stage covered by non-exclusive reconnaissance permits. Followed by search licenses, valid for four years, during which minimum must be spent on exploration and one deep well drilled in Zones I and II (no drilling obligation for continental shelf). Holder entitled to exploitation concession on discovery. **In case of biddings:** Preference to offers with financial participation to the State, first to those offering 50%, then 34% or more; in case of similar offers, preference to companies offering to bear the risks of exploration without charge to State. **Area:** Maximum 20,000 sq km in Zone I; 40,000 sq km in Zone II; no maximum for continental shelf. **Duration:** May be extended two successive four-year periods in Zone I, and for two of four years and one of three years in Zones II and III, with surface area reduced to 75%, 50%, and 37.5%. **Surface Tax:** In francs, from 500 per square kilometer initial period in Zone I to 15,000 for a special extension in Zone II. Tax is reduced by 20% if the area is 250 km from the sea and 40% if 400 km. **Relinquishment:** Any time in whole or part.

EXPLOITATION: 30 years; extension to 50 at the option of concessionaire. One person may hold 3,000 sq km in each of Zones I and III, and 5,000 in Zone II. **Surface Taxes:** 5,000 francs per square kilometer in Zones I and III; 15,000 francs in Zone II, with reduction for distance from sea. **Royalty:** Payable in cash or kind, maximum 14% on 20,000 b/d. Total royalty may not exceed 12½% (first 1,000 b/d free of royalty). On natural gas, 5% from 300 million cubic meters a year. Upon attaining 1,000 tons (about 7,500 b/d) of crude or one million cubic meters a day of gas, surtax payable to bring the State's tax revenue up to 50%. Companies with 34% or more State participation excused from surface taxes. If also assume risks of exploration, surface taxes may be reduced or, where State has at least 50% participation, eliminated. Companies with 50% State participation excused from surface taxes, but they are nevertheless taken into account to determine taxable profits. Maximum areas for licenses and concessions increased when State has 50% participation. Foreign holders of reconnaissance permits and search licenses must furnish foreign exchange. Holders of exploitation concessions may retain 50% of foreign-exchange earnings from oil exports, out of which their needs of foreign exchange must be satisfied; but companies accepting 50% participation may, with government consent, retain more than 50% foreign-exchange earnings. Duty-free imports of materials, exploration expenses, and dry holes deducted or amortized. Permitted deductions may be carried forward 10 years. Provisions for arbitration, by international practice. Obligation to produce up to limit of commercial outlets, and to apply secondary-recovery methods. Priority to local market, after which 50% excess production may be freely exported, rest subject to authorization.

MOROCCO—ENI CONCESSION

Principal terms of ENI concession follow. (Text of the concession has not been printed, and this summary is not taken from the original.) Agreement, signed July 26, 1958, provides for exploration and exploitation by joint company known as SOMIP, owned 50%

(continued)

MOROCCO *(continued)*

by Morocco and 50% by AGIP. Contract subject to new oil law. All SOMIP's exploration expenses of $4.5 million in first four years and $1 million during next 11 years to be borne by ENI. Financial participation by Morocco only occurs on discovery of a commercial oil field, when 50% of exploratory expenses shall be reimbursed by Morocco to ENI from exports of production. 50% of SOMIP's profits will accrue to Moroccan government in taxes. Additional 25% of SOMIP's profits will accrue to Moroccan government from its ownership, resulting in 75% share to Moroccan government. Requirements of Moroccan market must be met before exports. Chairman of SOMIP's board is Moroccan, and general manager is Italian, during initial stage. When commercial production has repaid Morocco's share of exploratory expenses, management and general direction will be shared equally between ENI and Morocco. Separate joint company to be established for construction of 26,000 b/d oil refinery, to operate on imported oil until a discovery is made by SOMIP (this refining obligation not part of concession contract itself).

NATIONAL FACTORS

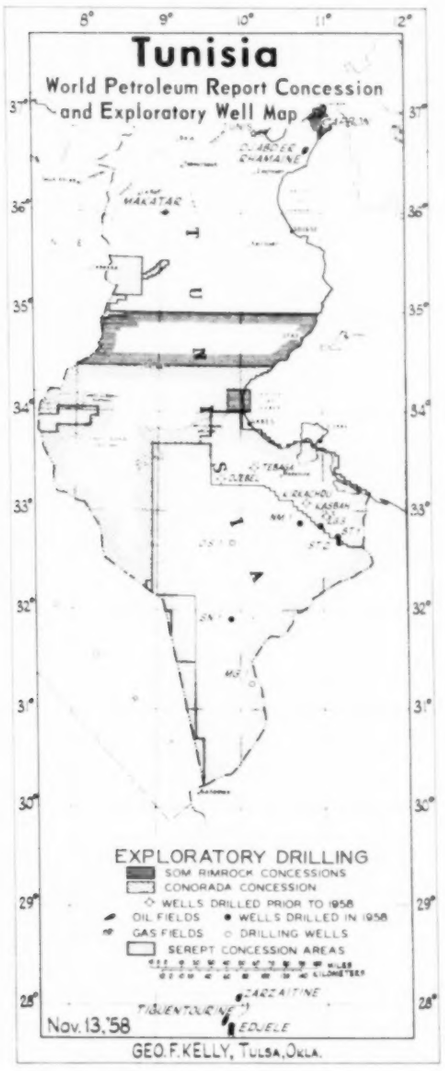
The attitude of the government toward international oil companies is thought to be favorable, but much remains to be determined, since the country's administration is yet so young.

Taxation consists of a profits tax of 20%. Special agreements may be made regarding exchange control which will permit repatriation of capital and profits. There is no limitation on foreign participation in Moroccan corporations. The unit of currency is the Moroccan franc, valued at 420 French francs (unchanged since devaluation). U.S. holders of francs may convert to dollars. END

TUNISIA

PHYSICAL DEVELOPMENT

EXPLORATION: New concessions were granted to Conorada Petroleum Corp. and to Soc. Olii Minerali during 1958. Ste. de Réchèrche et d'Exploitation des Pétroles en Tunisie (SEREPT) also received two new concessions (see map). Conorada is owned by Ohio, Amerada, and Continental companies, three well established independents in the USA. Soc. Olii Minerali (SOM) is a Sicilian company, subsidiary of the USA concern Rimrock International, which is majority-owned in turn by Husky Oil Co., independent, with Canadian and United States production. SEREPT, owned 70% by the French government and 30% by the Tunisian government, was the only firm to drill in Tunisia during 1958.



Production during 1958 from the Cap Bon gas field rose to 595,863 cubic feet daily, and gasoline production for the first 10 months reached 297,455 US gallons. An installation for repressuring of the Cap Bon gas field was completed. Total footage drilled from January to November 1, 1958, was 33,433 ft.

Two new permits lying in the extreme southwest of Tunisia were granted to SEREPT. Five permits were dropped—all lying north of Gabès—bringing the total concession area to 23,313 square miles. SEREPT's exploration activities during 1958 were concentrated on the extreme south of Tunisia, where three rigs (two heavy and one medium) were in operation. Two deep wells were completed: Djebel Sanrhar (SN.1), spudded in January 1957, reached a total depth of 13,042 ft in the Cambrian, in May 1958. Sidi Toui (ST.1), spudded in January 1958, reached a total depth of 9,003 ft in the Inferior Paleozoic, in August 1958. Both these wells were stopped in the granitic basement.

The Ideco H-40 rig has completed three wells: Bou Nemcha (Nm.1), spudded in September 1957, reached a total depth of 4,239 ft in the metamorphic basement, in January 1958. Sidi Toui (St.2), spudded in January 1958, reached a total depth of 5,714 ft in the Cambro-Ordovician, in June 1958. Erg Leguine (Lg.3), spudded in June 1958, reached a total depth of 5,111 ft in the Ordovician, in October 1958. Fair oil shows were encountered in the Trias at SN.1, and in the Ordovician at SN.1, ST.1, and Lg.3.

The National 130 rig is drilling a wildcat at Bir El Adame (Mechiguig region), well MG.1. Spudded in July 1958, it had reached 7,160 ft on November 1. The National 80-B rig was drilling a wildcat at Oued Siah (Dahar region), well OS.1.

Two geophysical crews worked during the year: the refraction crew in the Dahar region, and the reflection crew in the Sidi Toui and Bir Rhezen regions.

Considerable exploration has been done in past years. SEREPT has drilled 36 wildcats since 1947. Only Cap Bon II and Cap Bon VIII turned out to be productive, giving a wet gas producing 149 liters of natural gasoline to 1,000 cubic meters of gas, with reserves in the field estimated at about 200 million cubic meters.

PRODUCTION: There is no production of crude oil. Gas production is covered under EXPLORATION, above.

REFINING AND TRANSPORTATION: There are no refineries. During 1958, the Tunisian government approved an agreement for a 16-in. pipeline from the Sahara to run north to a terminal on the Gulf of Gabès, probably at La Shkirra.

OIL LAWS*

Controlling Statutes* include: Decree of March 23, 1953, fixing the conditions of application of the Decree of January 1, 1953; Decree of November 24, 1953, amending Decree of March 24, 1953; Decree of Mines of December 29, 1913; Order for the Application of the Decree of December 29, 1913, on the Mines—dated January 10, 1914; Decree of October 23, 1947, modifying the Decree of December 29, 1913, on Mines insofar as research permits for mineral substances of the second group are concerned; Ste. Nord-Africaine des Pétroles—Memorandum of Obligations—translation of official text as published in the *Journal Officiel Tunisien*, No. 20, of March 10, 1950; Decree of December 13, 1948, and Model Convention and Model Cahier des Charges attached thereto; Arrets of Director of Public Works of December 17, 1948, relative to the renewal of exploration permits; Decree of January 1, 1953, Attachment to Decree of January 1, 1955; Conorada Petroleum Corp. Agreement with the Tunisian Government of March 1958.

There have been no basic changes in Tunisia's oil regulation. For a résumé of the law's provisions, see *World Petroleum Report—1958*.

The recent concession contract granted to Conorado conformed substantially to the terms of the oil law, with some added features such as a 15% royalty and a 50-50 profits split in the event of production. It calls for a five-year exploration period which may be extended three times for three-year periods. There is no annual rental other than the work obligation.

NATIONAL FACTORS

The government's attitude toward international oil investors became more liberal during 1958 and, as a result of a change of attitude, the government is relinquishing its one-third share of SEREPT.

The government of Tunisia, headed by President Bourguiba, has remained firmly on the side of the West. During 1958, Tunisia broke with the United Arab Republic when President Bourguiba charged an attempt was being made to assassinate him.

* Translations of oil laws cited are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y. (see p. 22 herein).
END

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CENTRAL & SOUTH AFRICA

The following national reviews will be contained in subsequent issues of World Petroleum: French Equatorial Africa, French Camerouns, Gabon, Ghana, Ivory Coast, Kenya, Liberia, Madagascar, Mozambique, Middle Congo, Nigeria, Portuguese Guiné, Somaliland Protectorate, Somalia, Senegal, Sudan, Tanganyika, Union of South Africa, Zanzibar.

ANGOLA

PHYSICAL DEVELOPMENT

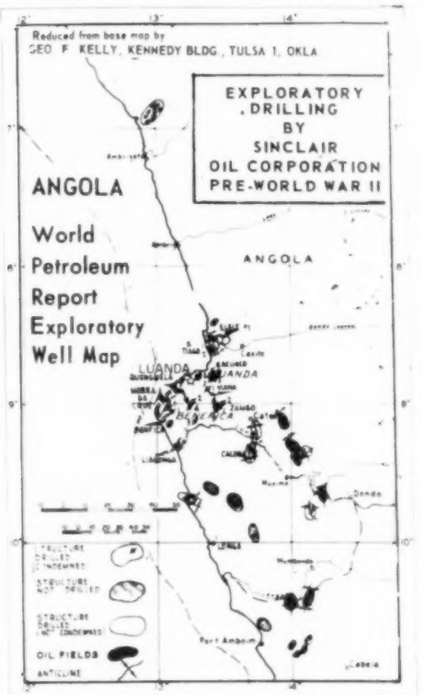
EXPLORATION: Exploration in Angola began in the 1920's when Sinclair Oil Corp. drilled 21 dry wells (see accompanying map) without success. The oil was there, as discoveries in recent years by Petrofina have proved, but techniques of drilling in the 1920's were not advanced enough to find it. If Sinclair had had facilities for acidizing, for example, it would have discovered a field, according to the company, or if good rotary drilling rigs of sufficient strength to drill deep wells had been available, production might have been found.

In any event, the concessions were renounced; and the Belgian company, Petrofina (see *World Petroleum Report—1958* for a brief description) received a concesssion and found a small production. At the beginning of 1958, nine oil wells had been completed in Benfica and Luanda oil fields.

Three recent wildcats had oil shows, the most important being at Zango and Cacuaco—1. The operating company is Cia. Concessionaria de Petroleos de Angola (Petrangol), newly established.

Cabinda Gulf Oil Corp. received a concession covering Cabinda, part of Angola. In December 1958, Gulf's first test, Ponta Vermelha No. 1, was spudded on July 4, 1958, a few kilometers south of the town of Cabinda.

PRODUCTION: Production comes from the only three discoveries so far, Benfica, Luanda, and Cacuaco fields, which are not yet very impressive. According to press sources, Benfica field can produce 1,260 b/d, and Luanda field is rated at 950 b/d potential.



ANGOLA—Petroleum Production

	Oil Production		Gas Production (Thousands of Cubic Feet)	
	Barrels Per Day	Cumulative to 12-31-57	Year	Cumulative to 12-31-57
1956	155		11,878	
1957	196	131,437	25,268	37,093

ANGOLA—Production by Fields (Barrels)

Field	Total Wells Drilled	Formation	Production 1957
Benfica	7	Aptian ls	11,940
Luanda	13	Albian ls	59,501
		Eocene	—
			196 b/d

Reserves: No definitive estimate of reserves has been received; however, a "research" program in Angola indicated that reserves (it is not known whether the figure relates to proved or unproved reserves) are "at least 10 million barrels of oil, and may be in the vicinity of 100 million barrels."

REFINING: Petrofina opened a 2,000-bbl refinery (topping plant) in 1958 near Luanda Bay, two miles north of the city of Luanda. Cia. Concessionaria dos Petroleos de Angola (COTA), newly formed by Petrofina and Portugal's government, will handle both production and refining. The present unit will be part of a larger refinery which will be built later. The plant is linked by a 6-in. pipeline with an adjoining tank farm and with Luanda field.

Based on 1956 imports, the new refinery's capacity will satisfy approximately one-third of the country's gasoline and gas-oil requirements, and will be more than double the fuel-oil requirements.

As of January 1, 1958, there was a reinstatement of former regulations requiring that 80% of the gasoline, kerosine, and gas oil marketed in Angola be refined in Portuguese territory (this regulation was rescinded after the Suez crisis).

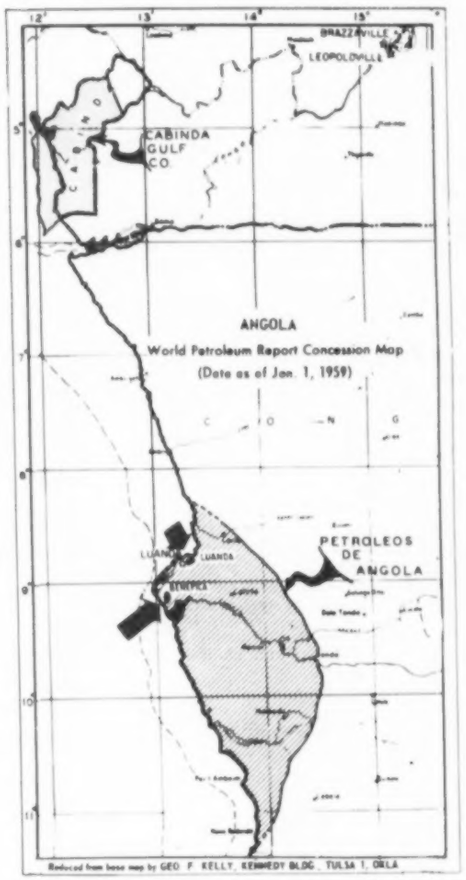
Local consumption during 1958 is estimated at:

	Barrels
Gasoline	468,000
Gas oil	448,000
Fuel oil	200,000

OIL LAWS

Regulation of the oil industry in Angola is generally subject to the laws of Portugal, based on the Mining Law of July 11, 1930 (Decree 18,713) with modifications contained in Decree 41,356, Regulations Regarding Concession Royalties from Oil Operations in the Overseas Provinces, and Decree 41,357, Regulations Regarding Income Tax on Oil Operation in the Overseas Provinces.

By Decree of October 22, 1957, Cia. Concessionaria de Petroles de Angola (Petrangol) was established to continue the exploration work in the area of its concession which had been done by Petrofina. This company will be owned 33⅓% by the government, 33⅓% by Petrofina, 11⅓% by Petrofina local subsidiaries, and the remainder by other groups and public subscription.



By Decrees 41,180 and 41,374 of July 9, 1957, and December 4, 1957, respectively, Cabinda Gulf Oil Co. was granted exclusive exploration and development rights for petroleum and related substances in the coastal region of the District of Cabinda.

NATIONAL FACTORS

One of the serious drawbacks to investment in Angola is the province's underdeveloped economic structure, with its resulting high operating costs. In addition, Portuguese capital has not generally sought investment opportunities in the area, except with guarantees of early

(continued)

ANGOLA *(continued)*

profits. This conservatism has proved to be one of the leading restrictive factors.

There is a rigid control over exchange payments and imports.

Labor: The labor supply is extremely limited. Immigration into Angola for non-Portuguese peoples is very restricted and stringently regulated, but aided by Portuguese immigration.

Taxes: In general, any mining enterprise, if operated by the concessionaire and not leased or sublet in any way, is exempt from corporation and income taxes which apply to other businesses. The tax structure of Angola is applicable to both foreign and national entities on the same basis.

It is estimated that the total rate of all taxation in Angola is approximately 50% to 60% of the net profits of large-scale businesses, and from 30% to 40% of the net profits of small businesses. END

BELGIAN CONGO

PHYSICAL DEVELOPMENT

EXPLORATION: Little exploration has been done, but results in the Central Basin have not been encouraging. Exploration is under way in the coastal zone by Petrofina for the Syndicat d'Études Geologique et Minière de la Cuvette Congolaise (see map). Petrofina sank two exploratory wells in the Central Basin, both dry, in 1955-57.

PRODUCTION, REFINING, MARKETING: There is no production. There are no refineries in the country.

Consumption during 1958 was approximately 10,100 b/d (crude-equivalent basis), 3.2% over 1957.

OIL LAWS*

There is no separate petroleum law governing oil operations. Ownership of all mineral resources is vested in the State. The Decree of September 24, 1937, forms the basis for developing these resources. Regulatory agency is the government, and normally the colony negotiates directly with the concessionaire.

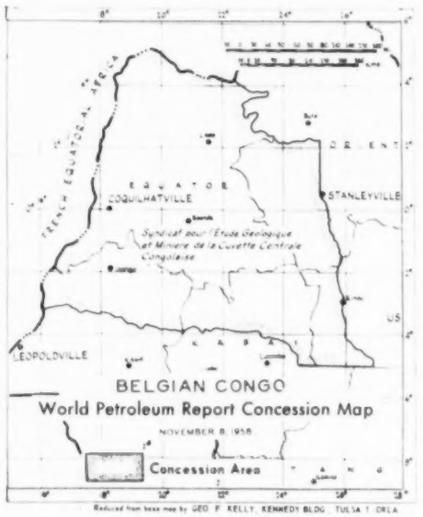
Operations are in three phases: general prospecting permit, special prospecting permit, and the exploitation permit. A fourth phase, the treatment permit, is optional.

General Permits: Valid for two years, and may be renewed. Companies registered for operations in the Belgian Congo are eligible.

Special Permits: Confers exclusive right. Prospector must show he holds a valid general permit, has made discovery, and is occupying the land. Special permit is valid for two years, and may be renewed three times for a like period.

The holder may dispose of the minerals produced, subject to taxation. Holder may transfer his permit, but only to one individual. Partial or joint transfers are prohibited.

Exploitation Permit: A company may receive an exploitation permit if satisfactory evidence of the existence of a mineral deposit is submitted. Government shall subscribe to 20% of the present capital of the company (and future capital increases), and vote 50% of the shares of the company of all categories. Granted for 30 years for surface deposits, and 50 years for subsurface deposits. If the area involved is at least 800 hectares, the permit will be granted for 22 years, subject to the order of the governor-general. No fees are assessed for exploitation or treatment permits. Royalties begin at one-tenth the value of the minerals extracted, rising to a maximum of 50%.


EQUATOR
COQUILHATVILLE
STANLEYVILLE
LEOPOLDVILLE
Syndicat pour l'Etude Geologique et Minière de la Cuvette Centrale Congolaise
BELGIAN CONGO
World Petroleum Report Concession Map
NOVEMBER 8, 1958
Concession Area
Reduced from base map by GEO. F. KELLY, KENNEDY BLDG., TULSA 1, OKLA.

NATIONAL FACTORS

Investment Policy: The same regime is applicable to Congolese companies and foreign companies. Foreign companies can operate freely in the Belgian Congo.

Expropriation can only take place for reasons of public utility; must be ruled upon by the courts, and calls for an indemnity.

Import exemption from customs duties is provided on machinery, for new industrial installations (decree of June 10, 1952).

Taxation: Companies subject to a graduated "professional" tax rising to 25% maximum.

* Copies of laws and their English translations are kept on file at offices of *World Petroleum Report*, 604 Fifth Avenue, New York 20, N.Y. The foregoing resume of legal provisions is taken from a summary prepared for the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) by Ely, McCarthy, and Duncan; Tower Building, Washington, D. C.

ETHIOPIA

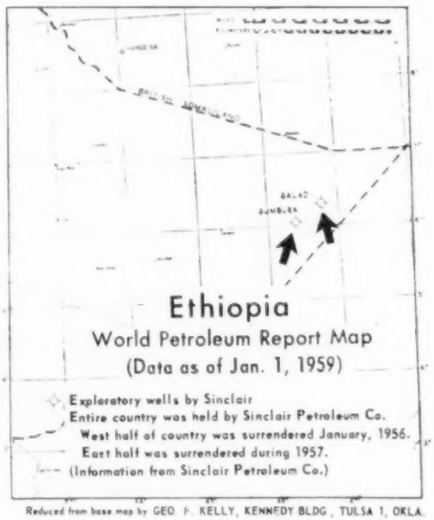
PHYSICAL DEVELOPMENT

EXPLORATION: Exploration ceased in Ethiopia when Sinclair drilled a number of dry holes (see map). During September 1958, Japanese companies were reported interested in exploring the coastal plains, but no action was taken. Representatives of Seaboard, Richfield, and Tidewater companies were reported in the country, but the reports were not confirmed.

OIL LAWS*

Concession contracts must be negotiated directly with the government. The last concession contract, that with Sinclair, is on file at the offices of *World Petroleum Legislation Report* in New York.

All concessions must eventually go through the Emperor's hands—which means a great deal of time is consumed in negotiation. END


DALAD
DUMBLEK
Ethiopia
World Petroleum Report Map
(Data as of Jan. 1, 1959)
Exploratory wells by Sinclair
Entire country was held by Sinclair Petroleum Co.
West half of country was surrendered January, 1956.
East half was surrendered during 1957.
(Information from Sinclair Petroleum Co.)
Reduced from base map by GEO. F. KELLY, KENNEDY BLDG., TULSA 1, OKLA.

No activity is reported and no reviews are contained in this issue for: British Togoland, British Cameroons, Basutoland, Bechuanaland, British Swaziland, Chad, Cape of Good Hope, Dahomey, Eritrea, French Somaliland, Ubangi-Chari, French Togoland, Ifni, Mauritania, Natal, Niger, Northern Rhodesia, Nyasaland, Orange Free State, Rio De Oro, Seika El Hamra, Sierra Leone, Spanish Guinea, Southern Rhodesia, Transvael, Uganda, Upper Volta.

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FAR EAST

The following national reviews will be contained in subsequent issues of World Petroleum: British Borneo, Burma, Indonesia, Japan, Korea, New Caledonia, Netherlands New Guinea, Papua, New Zealand, Pakistan, Philippines, Portuguese Timor, Taiwan, Thailand.

No activity is reported and no reviews are contained in this issue for: Bhutan, Ceylon, Indochina, Malayan Union, Nepal, Tibet.

PHYSICAL DEVELOPMENT

EXPLORATION: There were no major discoveries during 1958 and early 1959, although exploration was actively pushed in many countries. However, a discovery in Papua stimulated interest throughout that whole area; and the favorable political climate brought a new wave of activity to Australia, especially Queensland.

During December 1958, a petroleum symposium was conducted under the United Nations' regional economic commission (ECAFE). A number of useful documents were submitted on the status of geology and petroleum development in the region.

PRODUCTION: During 1958, production within the region rose to 451,650 b/d*. The principal increase occurred in Indonesia, one of the world's great oil-exporting centers. The rise in that area's production is about over, however, unless new concessions are granted soon.

*Includes British Borneo, Burma, India, Indonesia, Japan, Pakistan, New Guinea.

REFINING, TRANSPORTATION: There are no major crude pipelines in this region, with the exception of some short pipelines in Indonesia. A major crude line was proposed in India, but construction on it has not yet begun.

Refining capacity of the entire region is 1,160,860 b/d†. The majority of this capacity is in Australia and Japan, but smaller refineries are planned or under way in Pakistan, India, and Burma.

†Includes Australia, British Borneo, Burma, India, Indonesia, Japan, Pakistan, Philippines, Thailand.

FAR EAST AND AUSTRALASIA — Future Supply and Demand for Commercial Energy

Commerical Energy Consumption[a]
Total Area (Thousands of Metric Tons of Coal-Equivalent)

Year	Coal and Lignite[b]	Hydroelectricity[b]	Petroleum Fuels and Natural Gas[b]	Total[b]	% Increase Over Previous Year
1948	71,714	22,800	11,766	106,280	—
1949	75,542	23,822	13,850	113,214	6.5
1951	87,088	25,334	19,871	132,293	10.6
1953	90,831	28,582	28,932	148,345	5.4
1955	90,886	33,067	36,145	160,098	5.2
Average annual rate of increase:					
1948 through 1955	3.4%	5.5%	17.4%	6%	
1951 through 1955	1.1%	6.9%	16.1%	4.9%	

[a] UN and other sources; 1955 partly estimated. [b] Conversion factors: one ton of lignite equals 0.33 metric ton of coal-equivalent; 1,000 kwh equals 0.6 metric ton of coal-equivalent; one ton of petroleum fuel equals 1.5 metric tons of coal-equivalent; 1,000 cubic meters of natural gas equal 1.3 metric tons of coal-equivalent.

Note: The foregoing table includes the following countries: Burma, Ceylon, China (Taiwan only), Hong Kong, India, Indo-China, Indonesia, Japan, Malaya, Singapore, British Borneo, Pakistan, The Philippines, South Korea, Thailand (Siam).

MARKETING: Consumption of oil products in the region during 1958 is estimated at 879,000 b/d‡. This is one of the lowest rates of oil use, per capita, in the world; but it is also one of the fastest rising.

A comparison of consumption figures with figures for indigenous production indicates this region is crude-starved. The deficit in oil supply must be imported—the largest proportion of these imports coming from the Middle East.

During 1955, roughly 22% of total commercial energy in the ECAFE area (see table) was derived from oil. It is likely that oil demand will increase at a rate of between 6% and 7% annually up to 1975. Consumption will double by 1965, and reach about 3.5 times 1955 levels by 1975. However, annual consumption of commercial energy, per capita, remains low—ranging from 0.03 metric ton of coal-equivalent in Burma to 0.99 metric ton in Japan.

‡Includes Australia, Burma, India, Indonesia, Japan, Pakistan, Philippines, Thailand.

OIL LAWS

Controlling Statutes: Governing oil laws for individual countries are listed in the following individual country sections. All laws cited have been collected and translated, and are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

The only completely new oil law passed during 1958 was in Afghanistan. New laws are awaiting passage in Burma, Pakistan, Indonesia, and Burma.

NATIONAL FACTORS

The countries of this region are generally highly nationalistic, but there is a growing awareness of the need for participation by international investors if indigenous production is to approximate the fulfillment of the rising demand brought about by growing population. The realization of this made the conference at New Delhi by ECAFE of more than passing interest. A number of declarations were made recognizing the need for stimulation of the oil industry.

(see table on page 212)

AUSTRALIA

PHYSICAL DEVELOPMENT

EXPLORATION: No discoveries have been made in Australia, but interest is growing, attracted mainly by the stable political environment. Since relatively little is known of Australia's geology, the negative results obtained to date are far from conclusive.

AUSTRALIA—Drilling
(Through 1956)

State or Territory	To 1945 Wells	To 1945 Footage	From 1946 Wells	From 1946 Footage
New Guinea	12	8,334	—	—
Papua	24	31,267	14	92,682
Queensland	46	158,324	22	103,995
New South Wales	13	38,654	3	12,839
Victoria	119	162,519	4	24,073
Tasmania	21	14,288	—	—
South Australia	38	40,765	28	26,001
Western Australia	10	15,927	27	144,276
Northern Territory	—	—	—	—
	283	470,078	98	403,866

Source: Bureau of Mineral Resources

Two independents, Santiago Petroleum Corp. and Plymouth Oil of Texas, recently obtained permits over large areas in Queensland; and Delhi-Taylor Oil Corp., a Texas independent, received in 1958 a one-third interest in licenses covering about 267,000 square miles from Santos Ltd., a local Australian company. Delhi agreed to drill a 14,000-ft wildcat, after which it will spend $500,000 per year for four years if it wants to continue its rights. Frome Broken Hill Pty. Ltd., composed of Vacuum Oil Co., BP Exploration Co., Consolidated Zinc Corp., and American Metal Climax Co., have joined Dehli and received a one-third interest in the venture.

Two more companies which recently joined the play are Gulf Oil Corp. and Carl M. Loeb-Rhoades & Co., the latter a recent Argentine entrant also.

WAPET Exploration: Continuing its six-year search, without good results yet, West Australian Pty. Ltd. (WAPET) reoriented its exploration in 1958 toward the Canning basin (Kimberley district) in the northern part of the state, following abandonment in March of Learmonth No. 1 at 7,636 ft, in the Exmouth Gulf area, Carnarvon basin. Meda No. 1, in the northern part of the Canning basin, about 40 miles east of Derby, was abandoned at 8,809 ft, but encountered several shows of gas at 6,845 ft to 6,888 ft in noncommercial amounts. A few gallons of crude oil were obtained at 5,110 ft to 5,123 ft.

Frome Rocks No. 1 well was spudded about 100 miles east of Roma, and was at 1,397 ft on January 14, 1959. Meda No. 2 is now (February 1959) being drilled 4,000 ft south of Meda No. 1.

Goldwyer No. 1, 35 miles south-southeast of Broome, was spudded, August 17. A formation test did not recover any formation fluid following oil shows in samples recovered between 2,900 ft and 2,965 ft. The well was abandoned at 4,574 ft. The shows prompted a decision to carry out additional work in Broome Ridge, Jurgurra Terrace, and Lennard Shelf areas.

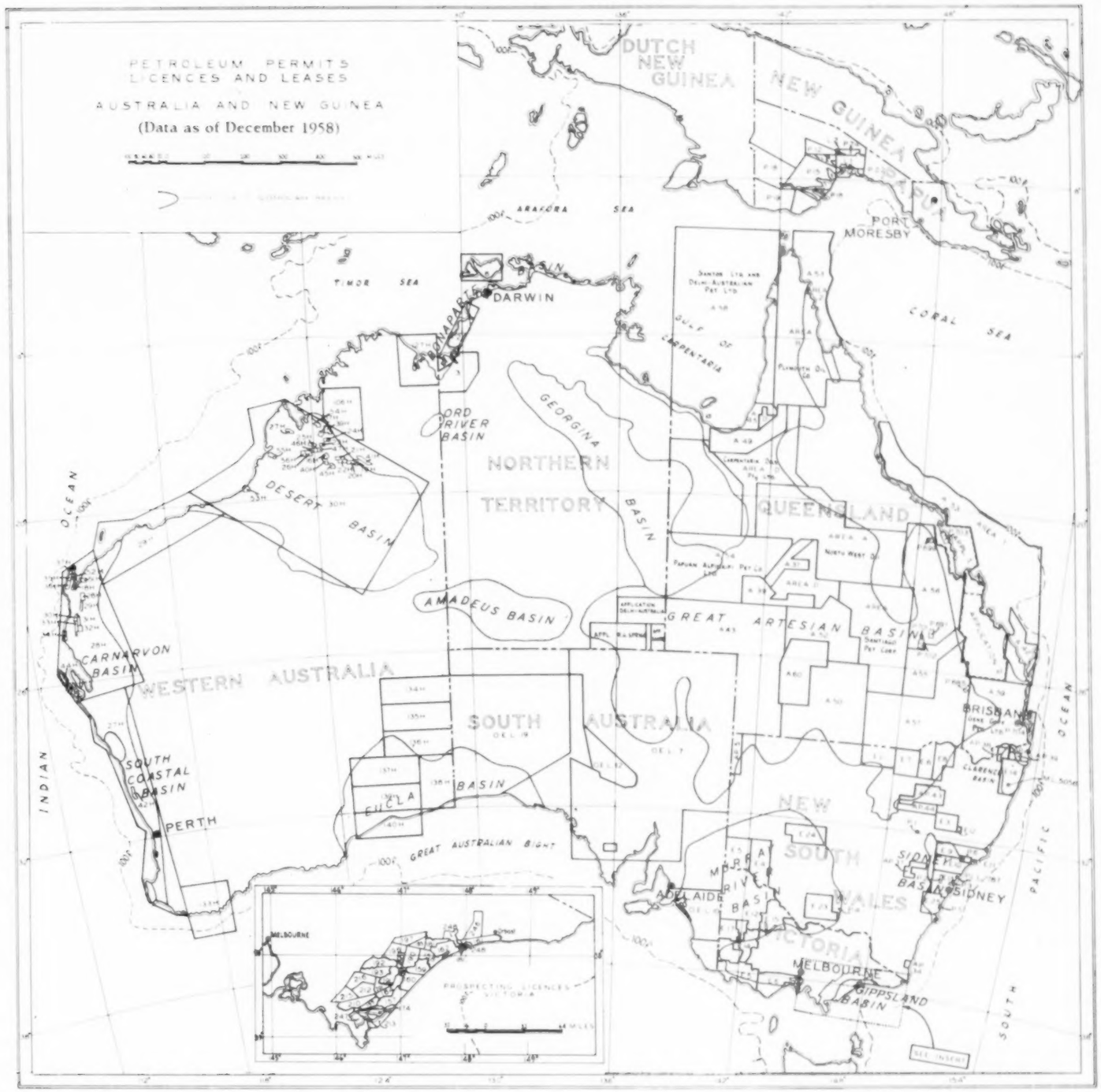
(Continued)

(Continued from page 127)

FAR EAST AND AUSTRALASIA—Petroleum and Tax Laws in Asia (Comparative Summary)

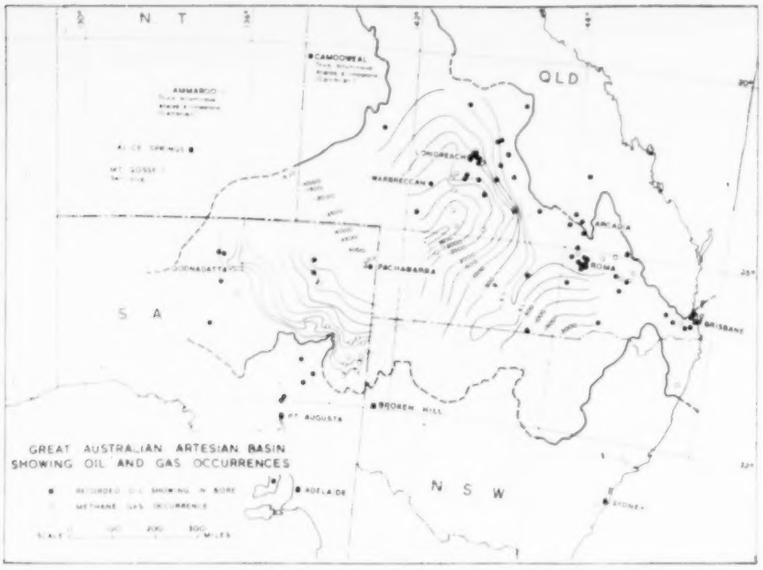
Exploration Right	Indonesia (Hectares)	New Guinea N.N.G.P.M. (Hectares)	Papua (Sq. Miles)	India (Acres)	Pakistan (Sq. Miles)	British Somaliland (Sq. Miles)	Philippines (Hectares)	Australia All States (Sq. Miles)	Australia Exceptions	Somalia (Sq. Miles)	Burma (Sq. Miles)
Duration and Renewal (years)	5+?	1956 See M.L.	1+3×3	2+2×1*	3+3×1	2+1*	4+2×3*	2+*	Queensland and Victoria Authority to Prospect	None —	2+2×1*
Max. Area	—	25,500,000	10,000	UNL.	5,000	UNL.	100,000	Min. 1000	—	—	2,000
Number Exploration Rights per Operator	UNL.	—	—	UNL.	10,000 in each Wing of Pak.	—	500,000 in each region 1,000,000 in Phil.	UNL.	—	—	UNL.
Rental	2.5 Sen	—	—	Re. 1 - Sq. Mi.	Rs. 100 P/100	—	P. 0.05 to P. 0.125	—	—	—	Ks 25 per 100
Work Oblig.	Diligence	Diligence	Satisfaction Administr.	—	Approv. program Rs. 5000 P/100	Diligence	programme P. 0.50-P. 3 -	Diligence	Negotiated	—	Approved Program
Surrender	—	To 50% before 1966 To 7,650,000 1976 To 3,750,000 1986	—	—	5th Yr. to 2/3 6th Yr. to 1/3	—	—	—	Negotiated	—	—
Prosp.—License	None	None	—	—	—	—	None	—	—	—	—
Term—Ren.	—	—	2+3×2	3+2×1*	4+1 Thereafter Discr. Adm.	4+1*	—	4+1*	Qu. 2+2×2* Vic. 4+2×1*	3+3×2*	3+2+1*
Max. Area	—	—	50% E/L Max. 5,000	UNL.	1,000	500	—	200	Vic. UNL.	UNL.	250
Number P.L	—	—	UNL.	UNL.	2,000 in each Wing of Pak.	UNL.	—	UNL.	Qu 5	—	Max. 2,000
Rental	—	—	1st Yr.—1 sh. to 8 Yr—20 sh.	Re 1 - Ren. Rs. 5 -	Rs. 500 Rs. 1,000 ren.	4/6 9/- ren.	—	5/-	S.&W. Asutralia 10/- on Ren.	—	K1-K3 per acre
Work Oblig.	—	—	See I/L	—	Rs. 50,000 P/100	Drill each P/L group P/L Negot.	—	Approved Program	Qu. Drill in 1st Yr.	Approved Program	Approved Program
Exploitation Right											
Duration and Renewals	40+?	75 incl. Expl.	21+21	20+20*	30+30*	30+30	25+25	21+21+	Vic. 15+UNL.	40+2+10*	20+20*
Maximum Area per Lease	—	—	50% P/L Max. 2,500	100 Sq. Mi. 1,000 Sq. Mi. in India	100	100 ½ of P/L	½ of E/L Max. 50,000	100	—	UNL.	5
Maximum per Operator	—	—	UNL.	UNL.	500 in each Wing of Pak.	UNL.	250,000 any region 500,000 in Phil.	UNL.	Vic. 4 Qu. 5	—	300
Rental	25 Sen.	**4¢—10 yrs. 7¢—10 yrs. 15¢—10 yrs 50¢—balance	£15—5 yrs. 30—5 yrs. 50—Bal.	Rs. 2-1st. 10 Mi. Rs. 3-next 40 Mi. Rs. 5-next 50 Mi. Rs. 10-balance	Rs. 2,000 Rs. 4,000 ren.	2/6 P. acre to 10/0 in 7th year	P. 0.50 P. 5.0	£10/-/**	—	Negotiated	K2 per acre-1st 10 sq. mi. K3 per acre-next 40 sq. mi. K5 per acre-next 50 sq. mi. K20 per acre-next 100 sq. mi. K20 per acre-exceeding 200
Royalty (%)	4	6—less 1MM ton 8—less 2MM ton 10—over 2MM ton	10	10%	12½	6 1st 5 yrs.[1] or 5 MM ton thereafter 12½	12½	10	Vic. 5	Negotiated (12½)	10
Corp. Inc. Tax (%)	52½	40	7	50+	56	25	28	37½***	—	30[2]	32-income tax**** 18-super tax****
Gov. Take (%)	50 Min.	—	—	50 Min.	50 straight[1]	50 straight	—	—	—	—	65
Import Duty (%)	Exempt	11	—	5¼	5¼	Exempt	Exempt[1] 1st 5 yrs.	—	—	Exempt	Exempt
Depl. All. (%)	As reduction on Inc. Tax	33⅓ of net	—	VAR 33⅓ of net (scale)	15 of net	—	—	—	—	—	—
Export Tax (%) on crude div. tax	4	None	—	—	None	Exempt	Exempt	—	—	—	—

* At discretion of administration.
** No credit against royalty.
*** Plus 15% dividend tax on distributed dividends.
**** Plus 18% dividend tax on distributed dividends and 16⅔% business profits tax.
UNL Unlimited.
P.S. Some countries allow exemption from import duty under exploration license; should be checked in each individual case. For details, the law of the relative country should be examined.
1) Terms of mining lease negotiated by Stanvac.
2) Exempt from income tax for first 10 years.



AUSTRALIA—CONCESSION HOLDERS

PAPUA: **Permit to Explore:** 15, 18 (2 areas), Island Expl. Co. Pty. Ltd.; 12, 14, 19, 24, Australasian Pet. Co. Pty. Ltd.; 22, Papuan Apinaipi Pet. Co. Ltd. **License to Prospect:** 1, Australasian Pet. Co. Pty. Ltd.; 2, 3, Island Expl. Pty. Ltd. SOUTH AUSTRALIA: **Oil Exploration License (O.E.L.):** 7, Santos Ltd.; 10, Murray Basin Oil Synd.; 12, Clarence Expl. Co. N.L.; 19, Oil Drilling & Expl. Ltd. NORTHERN TERRITORY: **Permit to Explore:** 2, Assoc. Aust. Oilfields N.L.; 3, Westralian Oil Ltd.; 8, Santos Ltd. **Applications (Permit to Explore):** Delhi—Australia; R. C. Sprigg; Santos Ltd. WESTERN AUSTRALIA: **Permit to Explore:** 27H, 28H, 29H, 30H, West Australian Pet. Pty. Ltd.; 106H, Westralian Oil; 127H, Gulf Oil Syndicate; 133H, Jackson Expl.; 134H to 140H (incl.), Oil Drilling & Expl. **License to Prospect:** 16H, 17H, 47H, Assoc. Freney Oilfields N.L.; 18H to 37H (incl.), 39H to 46H (incl.), 51H to 56H (incl.), West Australian Pet. Pty. Ltd. NEW SOUTH WALES: **Exploration License (E):** 2, 4, 5, 6, 7, 8, 9, 13, 23, 24, Aust. Oil & Gas Corp. Ltd.; 10, Oil Search (for A.O.G.); 3, 12, E. Gulliver; 11, R. W. Addison (Nom. P. E. Gould); 14, Clarence River Basin Oil Expl. Co. N.L.; 25, Aust. Iron & Steel Pty. Ltd. **Exploration License Applications (Ap.):** 34, 37, E. J. E. Pascoe; 38, 39, 41, B. C. Hancox & W. J. Marshall (Nom. Builders Inc. Pty. Ltd.); 43, Builders Inc. Pty. Ltd.; 44, J. A. O'Shea (Nom. Composite Industries Pty. Ltd.); 45, Clarence River Basin Oil Expl. **Prospecting Licenses (P):** 1, J. C. Reynolds; 2, 3, Aust. Oil & Gas Corp. Ltd.; 4, C. J. Ellis; 5, Cons. Oil Pty. Ltd.; 6, P. E. Gould (Sun Oil Co.—Nominee); **Mining Lease:** J. A. O'Shea. **Private Lands Lease:** 787, Misses M. E. Olarenshaw & A.F.S. Harrison. VICTORIA: **Petroleum Exploration Permits (E):** 5, 6, Frome Broken Hill Pty. Ltd.; 12, Lochiel Oil Search & Prospecting Co. Ltd.; 14, 15 Woodside (Lakes Ent.) Oil Co. Ltd.; 17, Dome Oil & Minerals Syn. N.L. (Applic. only). **Petroleum Prospecting Licenses:** 157, 158, 159, 160, 161, 162, 181, 190, Lakes Oil Ltd.; 164, 180, 184, 185, 191, 212, 215, 216, Victorian Oil N.L.; 174, 213, 247, Woodside (Lakes Ent.) Oil Co. N.L.; 192, 193, Australian Paper Manuf. Ltd.; 196, 197, 201, 248, Oilco Ltd.; 246, A. E. Ekberg; 199, 210, Westralian Oil Ltd. QUEENSLAND: **Authority to Prospect (A):** 37, Central Queensland Petroleum Co. Ltd. & Magellan Corp.; 39, Trans Pacific Corp.; 42, Lucky Strike Drilling Co.; 43, Santos Ltd.; 45, Associated Aust. Oilfields N.L.; 49, Assoc. Freney Oilfields N.L.; 50, Oklahoma Aust. Oil Co.; 52, Aust. Amer. Oil Co. Pty. Ltd.; 53, Humber Barrier Reef Oil Pty. Ltd.; 54, Papuap Apinaip Petrol. Co. Ltd.; 55, Assoc. Aust. Oilfields N.L.; 56, Assoc. Freney Oilfelds N.L.; 57, Aust. Oil & Gas Corp.; 58, Santos Ltd. & Delhi Aust. Pet. Ltd.; 59, Gene Goff Pty. Ltd.; 60, L. H. Smart Oil Exp. Pty. Ltd. **Area A,** North West Oil; **B,** Plymouth Oil Co.; **C,** Magellan Petroleum Corp.; **D,** Carpenteria Oils Pty. Ltd. **Applications:** 1, 2. **Petroleum Prospecting Permits (P):** 685, Condamine Oil Co.; 697, Planet Exploration Pty.; 699, W. O. & H. J. Walz & A. E. Zunker; 701, Planet Exploration Co. Pty. Ltd.; 702, J. G. Fuller; 703, J. Bielke Petersen & E. E. Evans; 704, Standard Gas Pty. Ltd.



AUSTRALIA ***(continued)***

Royal Dutch-Shell acquired a 2/7 interest in WAPET during 1958. Proportionate interests of California Asiatic Oil Co., Texaco Overseas Petroleum Co., and Ampol Exploration Ltd. in the venture will not be affected; Ampol Exploration Ltd. will hold 1/7 and the others 2/7 each.

Other Company Exploration: Humber Oils Ltd., Calgary, Canada, acquired an oil exploration permit in 1958 covering 53,000 square miles on the Great Barrier Reef of Australia, off the eastern coast. Sun Oil Co. of California plans to drill a number of test wells near Maitland, lower Hunter River valley, central New South Wales, Australia. For Papua activity, see that section.

PRODUCTION, REFINING, MARKETING: There is no significant production of oil in Australia at present. However, the country's consumption of oil is among the highest in the world on a per-capita basis, and there is a large indigenous refining industry, as shown in the accompanying table. In addition to the refineries there listed, Standard Vacuum Refining Co. plans to build a 32,000 b/d oil refinery near Adelaide, South Australia, on the shores of St. Vincent's Gulf. Date for beginning construction has not been fixed, but some engineering work will begin almost immediately.

Production of high-impact polystyrene plastic began in May at a new plant at Rhodes, NSW, Australia, built by CSR Chemicals Pty. Ltd. of Australia.

Shell Chemical (Australia) Pty. completed a $1.2 million sulfuric-acid plant at the Shell refinery at Geelong, Victoria.

Consumption: During 1958, consumption averaged 196,000 b/d, according to official estimates, a rise of 5.4% during the year. Refining capacity is about 10% over consumption, so there are appreciable amounts of petroleum products exported. Exports in the first six months of 1958 were 196 million Imperial gallons, valued at £10.8 million (US $24.2 million) against 179 million gallons exported during the whole of 1956-57.

OIL LAWS*

Changes in the oil legislation of Australia were made during 1958 to encourage exploration. Oil regulation is the exclusive competence of the various states of Australia, which are highly independent; and three of them, Queensland, South Australia, and Victoria, were contemplating liberalization of their oil laws. (For a review of the oil law of Western Australia, see *World Petroleum Report—1957*). Queensland particularly is considering measures which would permit an unlimited number of exploration licenses to be held by one company and a royalty of 10%.

Substantial income-tax benefits have also been enacted by the federal government. One such tax change allows deduction in a single year of exploration expenditures, as is allowed in the USA.

*Copies of Australia's oil laws are kept on file at the offices of *World Petroleum Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

AUSTRALIA—Refineries
(As of June 3, 1958)

Name of Company	Plant Location	Crude Capacity (Barrels Daily)	Type of Plant	Cracking Capacity
Australian Oil Refining Pty. Ltd.	Kurnell, NSW[1]	36,000	SC	20,000 C
Bitumen & Oil Refineries (Aust.) Ltd.	Matraville, NSW[2]	17,000	SA	—
	Hamilton, Q'land	2,000	SA	—
BP Refinery (Kwinana) Ltd.	Kwinana, WA[3]	70,000	SCA	12,500 C
Shell Refining (Aust.) Pty. Ltd.	Geelong, Vic.[4]	50,000	SC	13,000 C
	Clyde, NSW[5]	11,500	SLA	—
Standard-Vacuum Refining Co. (Aust.) Pty. Ltd.	Altona, Vic.[6]	36,000	SLAC	18,000 C
	TOTAL	222,500		63,500 C

[1] 20,000 b/d fluid catalytic cracker; 7,000 b/d propane decarbonization unit; 2,000 b/d polymerization unit. [2] 4,500 b/d Platformer; 5,400 b/d naphtha Unifiner; 4,700 b/d diesel Unifiner. [3] 12,500 b/d fluid catalytic cracker; 6,000 b/d Platformer; 5,600 b/d desulfurizing plant; 10,000 b/d catalytic reformer to be completed end 1958. [4] 13,000 b/d fluid catalytic cracker; 6,700 b/d catalytic reformer; 2,800 b/d catalytic polymerization plant; 11,000 b/d hydrodesulfurizer to be completed mid-1959. [5] 6,700 b/d catalytic reformer for end-1958 completion. [6] 18,000 b/d Thermofor catalytic cracker; 6,000 b/d Sovaformer; 1,600 b/d alkylation unit; 11,000 b/d desulfurizing plant to be completed 1959; crude capacity will be raised to 41,000 b/d during 1959.

Key to type of plant: S—Skimming; L—Lubricating; A—Asphalt; C—Cracking; Comp—Complete. Under cracking capacity to indicate type: C—Catalytic.

Source: Petroleum Information Bureau, Melbourne, Australia. Information has been verified by all companies concerned. In addition to the plants listed, see accompanying text for description of 24,000 b/d refinery to be built by Standard Vacuum Oil Co.

OIL LAW SUMMARY—QUEENSLAND

RECONNAISSANCE: An Authority to Prospect for Petroleum may be issued to any acceptable person, or company. Area, duration, etc., are at the discretion of the Minister for Mines. More than one authority may be issued to the same title-holder, and there is no limit to the area which may be granted. Over a period of years, the area is successively reduced and the holder is obliged to spend increasing amounts on prospecting. Other conditions, such as periodic reports, diligent search, etc., are applied. **Deposit:** At least £2,000 required. The area granted is proclaimed not open to permit or lease under the Petroleum Act until such proclamation is revoked. In some cases, conditions are very liberal, but very considerable expenditure is then necessary. **Rental:** Three pence per square mile per annum. Discovery of petroleum on an "authority" must be advised to the minister within 14 days. Holder of an "authority" may, on discovery of petroleum, cover the locality with a petroleum lease.

EXPLORATION: Petroleum Prospecting Permits may be taken out by any acceptable applicant over vacant territory, but only the holder of an "authority" can do so within that area. **Area:** Maximum is 200 square miles; five permits may be held in one name. Land within one permit does not have to be contiguous. **Duration:** Two years, with extensions available. **Application:** Made to the nearest warden, and is to be accompanied by a sum equal to five shillings per square mile applied for, this being rent in advance for one year. A deposit of not less than 1,000 pounds is required before the permit is granted. **Work:** Exploration must begin within four months, and drilling of a test well within one year of issue. Periodic progress reports are required. **Boundaries:** Must be suitably marked and conspicuous signs set up.

EXPLOITATION: Holders of "authorities" or permits have preferential rights to petroleum leases within their areas, and may be required by the minister to take a lease over any discovery of oil. **Area:** Cannot exceed 100 square miles or occupy more than half the area of a permit from which it is taken. No person or company can hold, or have interests in, more than five leases at one time. That portion of a permit not taken under lease remains covered by the permit for a period of 12 months. **Duration:** 21 years with right of renewal for further periods of the same duration. **Rental:** £10 per square mile per annum, paid in advance. **Bond:** Not less than £1,000 required. Leases are only granted where it is established that payable petroleum has been discovered. **Royalty:** 10% of the gross value of petroleum produced, over and above that used for productive purposes. Payable monthly. Royalty is offset against rentals with respect to each permit. Conditions relating to leases include diligent exploitation of the lease, submission of reports and production figures, and compensation to owners of private land within the lease. Any person, or company, holding, or proposing to hold, a concession who wishes to raise money to finance the undertaking must submit a written document, such as a prospectus, notice, circular or advertisement, to the minister for approval before issue or publication.

NATIONAL FACTORS

Based on strictly legal and economic factors, Australia is a relatively favorable site for oil investment. The principal *favorable aspects* are: (a) The attitude of the federal and state governments toward private international investment in the oil industry of Australia is favorable. (b) Petroleum legislation appears fair and workable. (c) The investment history of Australia is good. (d) The level of taxation is lower than in the USA. Federal legislation permits deduction of all exploratory expenses on discovery of commercial production. (e) Labor productivity is high. END

CENTRAL AMERICA

The following national reviews will be contained in subsequent issues of World Petroleum: Bahama Islands Barbados, British Honduras, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Netherlands West Indies, Nicaragua, Panama, Puerto Rico, Trinidad.

PHYSICAL DEVELOPMENT

EXPLORATION: No exploratory discoveries of major significance have been made in recent years; however, intensive drilling has just begun in Guatemala, an untested area with considerable promise.

OIL LAWS

Controlling Statutes: The governing oil laws of each nation are listed in the appropriate country sections. All known laws for the regulation of oil exploration and development in this region have been collected and translated. They are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

During 1958, new oil laws were promulgated in Nicaragua, Cuba, and Mexico. Only the Nicaraguan law was a completely new law; the others were all modifications of laws already existing. All were aimed at further improving the investment climate.

NATIONAL FACTORS

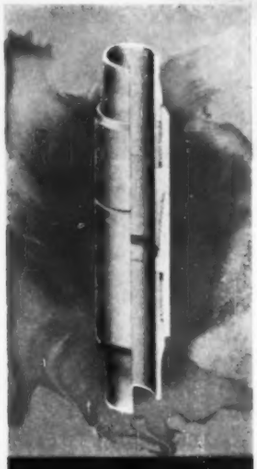
Excluding Mexico, where a decree of late 1958 completed the expropriation begun 20 years before, there has been a general trend evident for some years toward increased participation by international companies. This trend, which began after World War II, was first evident in Cuba, followed by Guatemala and continued, during 1958, in Nicaragua. What effect the recent successful revolution in Cuba will have is not yet clear.

CENTRAL AMERICA & CARIBBEAN* — Oil Statistics, 1958

(Barrels Per Day)

Production	369,900
Refining:	
Crude charging	1,264,600
Cracking	368,900
Consumption	350,000

*Includes Bahamas Islands, Barbados, British Honduras, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Honduras, Haiti, Jamaica, Mexico, Netherlands West Indies, Nicaragua, Panama, Puerto Rico, Trinidad and Tobago, and Virgin Islands, others. END



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SOUTH AMERICA

This section reviews area developments only. For national details, see individual country sections hereafter.

The following national reviews will be contained in subsequent issues of World Petroleum: Bolivia, Brazil British Guiana, Chile, Ecuador, Paraguay, Peru, Surinam, Uruguay.

PHYSICAL DEVELOPMENT

EXPLORATION: 1959 promises to be an exceptionally active year in South America's oil exploration, with most effort to be put forth in Argentina. Venezuela occupied the center of the stage during 1958, with a series of exploratory discoveries in Lake Maracaibo. The crest of these discoveries is now about at its peak; more will undoubtedly be made in 1959 (for example, the new Phillips find in January); but the new income tax will probably slow operations, and the oil industry's attention is expected to focus on Argentina.

Outside of a minor oil find in Peru's Sechura area, there were no other discoveries of note. Brazil continued her hunt vigorously, but without positive results. However, Paraguay and Bolivia are now being actively explored by private companies for the first time in many years, and wildcat wells are drilling in both countries.

PRODUCTION: During 1958, production in this area declined slightly to 2,972,785 b/d. Brazil's production rose sharply with more intensive development of the Bahia fields, but these are approaching their maximum now. Other areas remained about the same; the decline manifested was due to the 7% drop in Venezuela's production which was, in turn, ascribable to import restrictions in the United States and to a general drop in demand during 1958. All the countries of South America produce oil with the exception of the Guianas, Uruguay, and Paraguay.

REFINING: Refining capacity in 1958 totaled about 1,334,630 b/d. Large refinery expansion programs are under way in Argentina and Brazil.

MARKETING: Consumption in South America rose to 863,900 b/d during 1958 (expressed in terms of crude-equivalent—see notes to the statistical table for crude consumption in WORLD section).

OIL LAWS

Controlling Statutes: A major event in South America was the relaxation of barriers against operation by international companies in Argentina. The new contracts concluded there afford participation by foreign capital even under strong nationalist sentiment. The contracts themselves have been collected and translated by this office in their complete verbatim text. They are on file for anyone interested to see at the offices of *World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y.

A second major change was the imposition of a much higher tax in Venezuela, raising the income-tax rate to 45% maximum. This, together with other levies, raises the government's share above 60% of net. It was the first open break with the 50-50 concept as it relates to a company already producing.

Important oil law changes are pending also in Paraguay, Chile, Bolivia, and Colombia. Brazil is watching the Argentine developments as a possible route to her own development.

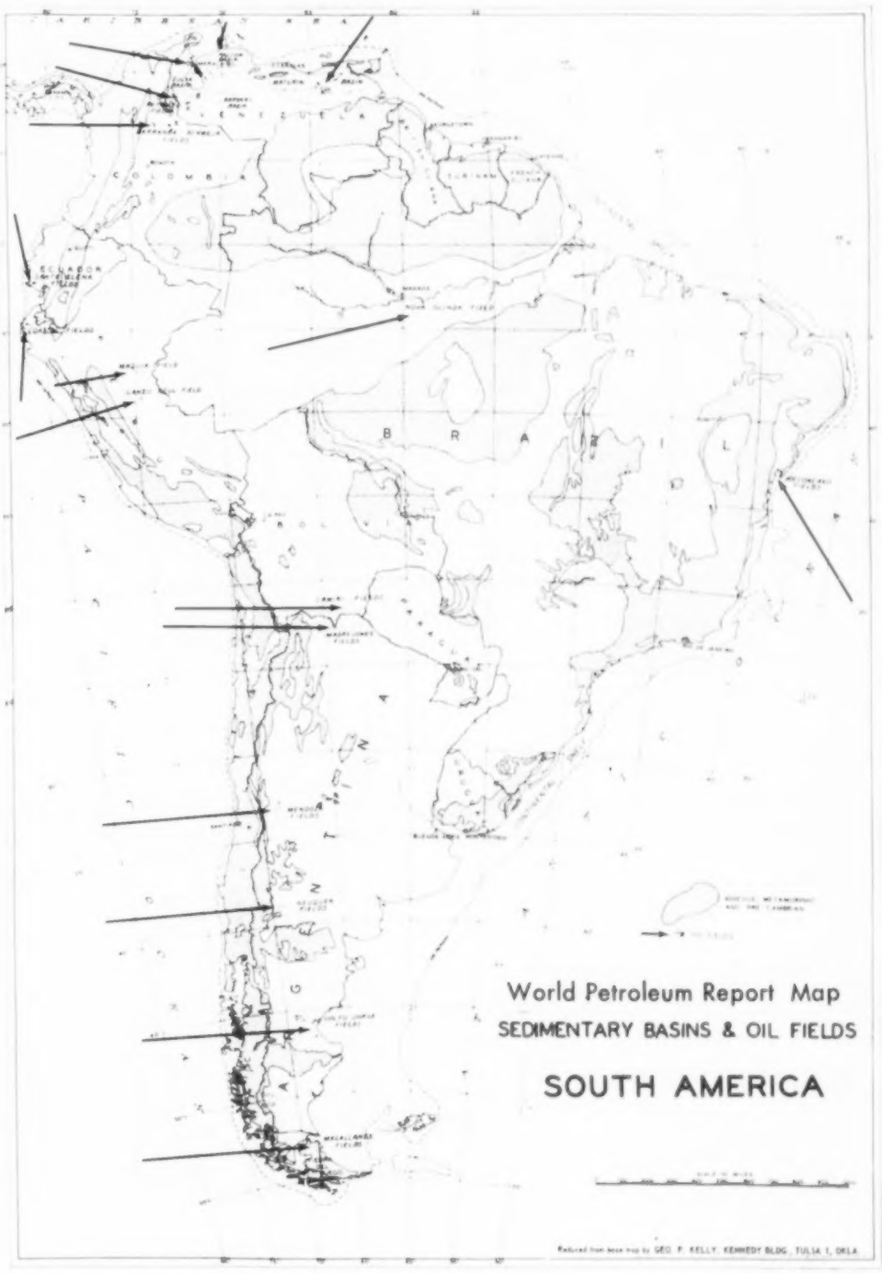
NATIONAL FACTORS

Argentina permitted participation by international companies in harmony with the government's oil agency, and this is an extremely influential development, particularly since most of South America (Brazil, Chile, Uruguay) remains subject to a government monopoly over oil in one form or another. These countries some time may follow Argentina's example.

Relations between companies and governments took a turn for the worse with the increase in oil income taxation in Venezuela. END

SOUTH AMERICA — Wells Drilled

	Gas Wells	Flowing	Pumping	Gas-Lift	Shut-in	Abandoned	Total to Jan. 1958
Argentina	107	124	2,472	29	2,543	2,104	7,421
Bolivia	—	71	34	—	31	20	156
Brazil	—	151	—	—	—	—	—
Chile	61	—	138	—	—	152	351
Colombia	—	181	1,183	54	454	304	2,599
Cuba	—	—	65	—	—	—	—
Ecuador	—	103	1,580	—	—	—	—
Mexico	76	1,127	371	233	2,540	375	4,572
Peru	—	302	2,776	—	—	6	24
Puerto Rico	—	844	2,158	—	1,874	—	—
Venezuela	35	2,556	5,747	875	3,819	3,226	16,851



ARGENTINA

PHYSICAL DEVELOPMENT

EXPLORATION: Exploration in Argentina since the 1920's has been dominated by Yacimientos Petroliferos Fiscales (YPF), a government agency. During 1958, the first break in this situation occurred when contracts with a number of private companies were signed. Two of them, one with Union Oil Co. of California, and the other with Shell, are for exploration in new areas. A large contract with Atlas Corp. for investment of over $600 million was rejected at the end of 1958. The others are for development of established producing areas. A contract signed with the local company, ASTRA, is for drilling only. YPF issues a call for tenders for drilling in proven fields. Small contractors with capacity for drilling 200 wells may have a chance to bid.

Areas covered by major contracts, actually signed as of December 1958, are shown in accompanying maps. The contracting companies, Carl M. Loeb-Rhoades & Co., Pan American International Oil Co. (subsidiary of Standard of Indiana), Union Oil Co. of California, Esso Sociedad Anonima Petrolera Argentina (subsidiary of Standard Oil of New Jersey), and Shell Argentina Ltd. (subsidiary of Shell Oil Ltd. and Royal Dutch) began their operations almost immediately. Ten new rigs had been shipped under the world's largest single drilling payment by Loffland Bros. for Pan American, and the first well spudded in December. Union, under the management of Messrs. Martin and Greenwalt, has under way a magnetometer survey, and Carl M. Loeb-Rhoades' drilling equipment arrived on December 24. Kerr-McGee is drilling contractor for the Mendoza area. The company estimates that, by May 1960, 50 wells will have been completed in the La Ventana area with a daily production of 24,000 bbl. An operations committee to manage the development program has been named, including Messrs. Clardy and Reynal for the company, and Señores Picandet and Persich for YPF.

Signal Oil & Gas Co. of California has received a 20% interest and Union Oil & Gas Corp. of Louisiana a 16⅔% interest in the Loeb-Rhoades contract.

Exploration by YPF: YPF had about 70 rigs operating at year-end 1958. Two contract rigs were working by Laughlin Bros. in Tierra del Fuego, where YPF discovered two oil and two gas fields on its side of Tierra del Fuego in 1958, to depths of about 6,000 ft.

PRODUCTION: Daily crude production in 1958 rose to 98,000 bbl, 7% over 1957—reaching 106,000 b/d in December, compared with 92,752 b/d in 1957. The percentage produced by private companies continued to decrease. YPF's production continued its increase, but was 12% below planned for 1958 due to strikes.

There is considerable shut-in capacity in Argentina. Campo Duran and Madrejones fields, for example, will be able to produce over 36,000 b/d condensate, 8,200 b/d LPGas, and 250 mmcf of gas when the pipelines are completed. In Rio Grande, Tierra del Fuego, 19 wells are capped for lack of transport.

Despite its favored position, a new budget report submitted by the government indicates YPF will have an operating loss of $30 million.

Argentina is setting its sights on self-suffi-

(Continued)

ARGENTINA—Percentage Importance of Petroleum
(Provisional Figures for 1957)

Energy Source	Amount Consumed (Tons of Oil-Equivalent)	Per Cent of Total Energy Use
Solid combustibles	993,249	5.7
Petroleum derivatives	12,970,416	74.3
Natural gas	730,029	4.2
Vegetable combustibles	2,636,238	15.1
Hydroelectric power	127,500	0.7
	17,457,432	

ARGENTINA—Natural-Gasoline Production

Year	Cubic Meters
1957	13,677
1956	13,432
1955	11,481
1954	12,966
1953	14,983
1952	15,516
1951	**12,720**
1950	10,989

ARGENTINA—Drilling (Meters)

Year	YPF	Private
1957	515,864	28,443
1956	489,044	47,502
1955	417,312	60,242
1954	407,429	60,292
1953	416,836	63,153
1952	361,819	59,643
1951	285,123	44,413
1950	277,073	45,067

ARGENTINA—Production and Drilling

Company	1958 Estimated Production (Barrels Per Day)	Wells Completed in 1957
Yacimientos Petroliferos Fiscales (YPF)	86,000	300
Diadema Argentina Petroleo	7,700	13
Astra Compania Argentina de Petroleo	1,830	0
Petroquimica	1,650	0
Esso SA Petrolera Argentina	740	2
Compania Rio Autel "El Sosneado"	—	0
	97,920	315[1]

[1] Bureau of Mines gives 339—298 producing, 41 dry

ARGENTINA—Production by Fields
(Barrels Per Day)

	1957	1958
Chubut*	32,800	—
Mendoza	24,700	58,000
Santa Cruz	21,200	23,500
Neuquén	11,650	13,000
Salta	2,550	3,500
	92,900	98,000

*Comodoro Rivadavia includes Chubut and Santa Cruz.

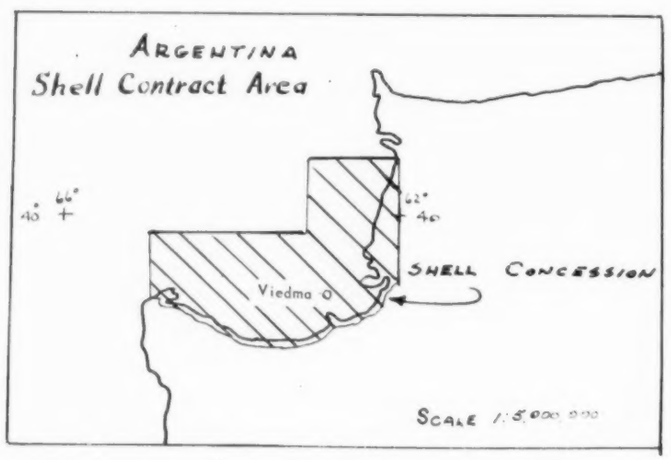
ARGENTINA—Pipeline Projects (Summary)

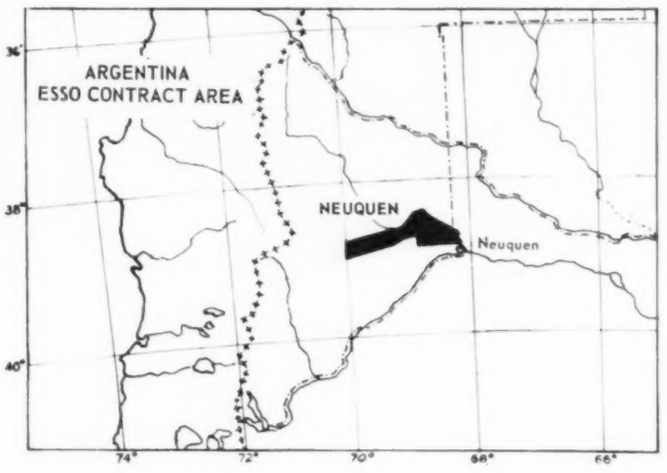
OIL LINES

1. Tucuman to San Lorenzo: Estimated 1,000-km 12¾-in. line; SARGO SA (organized in Argentina by USA and Argentine concerns); construction under way, 1960 completion; capacity 47,000 b/d.
2. Plaza Huincul (Nequén) to Bahia Blanca: 600-km 14-in. line; to be financed by Esso SAPA (Standard of New Jersey); would expand production 50%—to 27,000 b/d from 18,000 b/d.
3. Lujan de Cuyo (Mendoza): 1,050-km 10¾-in.; initial capacity with three pumping stations 23,200 b/d, with seven stations 39,800 b/d; bids presented Aug. 1958; allocation of project pending YPF decision.
4. Comodoro Rivadavia fields to Comodoro Rivadavia port: 40 miles (Pan American to build); not shown on map.

GAS LINES

1. Campo Duran to Buenos Aires: Estimated 1,800-km 24-in. line; construction under way by SARGO SA; 1960 completion; capacity 250 million cubic feet per day, 25% above present output—both gas and oil lines: 5a (1) being constructed by SARGO SA under $180 million contract.
2. Comodoro Rivadavia to Buenos Aires: New line to cost $130 million; possibly 30-in.; under study by YPF; tenders calling for bids will be issued soon.





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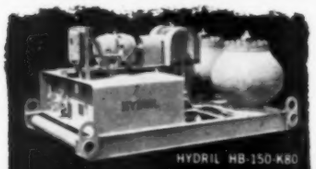

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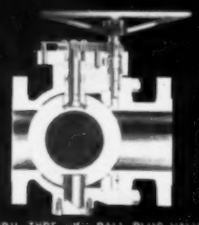

HYDRIL TYPE "K" BALL PLUG VALVE

HYDRIL "GK" BLOWOUT PREVENTER

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No blowout prevention control program is better than the power available to operate it, and HYDRIL AUTOMATIC PUMP ACCUMULATORS made to match Hydril Blowout Preventers, assure safety in *any* control system by providing a constant, instantly available source of hydraulic power to actuate hydraulically operated blowout prevention equipment. Choice of engine or motor driven units, in a wide range of hydraulic storage capacities.

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HYDRIL BLOWOUT PREVENTERS successfully contain dangerous downhole pressures while permitting various sized members of the drill string to pass in and out of the hole . . . will actually pack off the open hole in complete safety!

Type "GK" for high-pressure wells, "MSP-2000" for low and medium pressures, "GK-6-10000" for highest pressures.

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You're steps ahead with Hydril's two-step thread. HYDRIL CASING JOINTS make up and break out faster because you make up two threads at once. They save running time . . . hold greater pressures because they seal at *three* places.

The same holds true for HYDRIL TUBING JOINTS. Pressure-tight when made up, you can depend on them to stay that way. There's a wide range of Hydril Joints for faster, safer drilling and completion operations.

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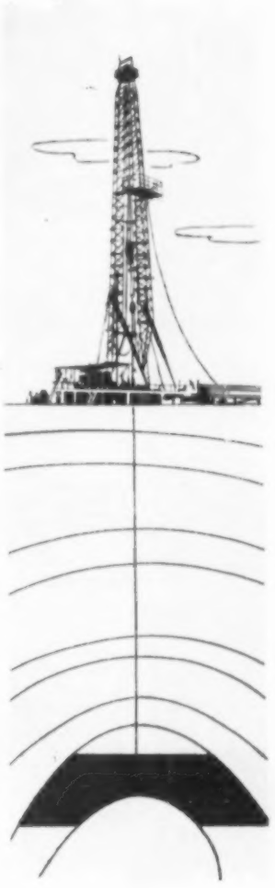

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ciency in oil by 1962; and Arturo Frondizi, Argentina's president, estimates YPF will triple its present output within three years, to more than 275,280 b/d. Counting on the offers already made, Argentina hopes to have more than 178,000 b/d of exportable surplus by 1964, or possibly higher.

Reserves: Proved reserves in Argentina are estimated by YPF at 2.5 billion barrels, equivalent to 350 million metric tons. For comparison, reserves in Canada are 3.6 billion barrels; Mexico, 3.0 billion; Venezuela, about 15 billion. About 50% of proved reserves are recoverable. Reserves of natural gas are estimated at 3.53 trillion cubic feet.

ARGENTINA—Planned Drilling

Year	By YPF	By Private Companies (Contractors)
1959	417	78
1960	542	593
1961	592	922
1962	592	988
1963	592	988
1964	592	988
Total	3,327	4,557

TRANSPORTATION: YPF has entered on an intensive pipeline development plan. During 1957, bids were called for on a three-part pipeline construction program (see *World Petroleum Report—1958*). Only two parts of the program were covered by (1) North American Utility & Construction Corp., Fish Northwest Contract Inc., and Fish Engineering Corp., of the USA, and (2) TIPSA, of Argentina. In compliance with contract, these companies organized the Argentine company SARGO SA to handle all matters related with same, and which figures as general subcontractor for the project. During late 1958, the third part was again put up for bids. It was awarded to Techint, an Argentine firm formed with the majority of capital Italian. It covered construction of a 387-mile 14-in. crude line from Neuquén province to Buenos Aires, together with auxiliary installations. Terms were 15% of the total cost payable within the first year, the rest on a sliding scale plus 7% interest. Since definite contract had not been signed, YPF transferred to Esso the financing and constructing of this pipeline.

Principal pipelines in use at present include: *Oil*—Campo Duran (Salta) to Tucuman, 570 km of $12\frac{3}{4}$-in., finished December 1958. *Gas*—Comodoro Rivadavia to Buenos Aires, 1,705 km of 10-in.; Plaza Huincul to Gral Conesa (Rio Négro), 460 km of 8-in.; Coñadon Seco-Comodoro Rivadavia line, 91 km. Both of these lines connect with the Comodoro Rivadavia-Buenos Aires line.

YPF plans 14-in. 600-km oil pipeline to run between Challaco, Neuquén province, and Arroyo Parejas, near the Bahia Blanca port Puerto Galván, where Esso is operating a 7,000 b/d refinery. The capacity would be 19,000 b/d of

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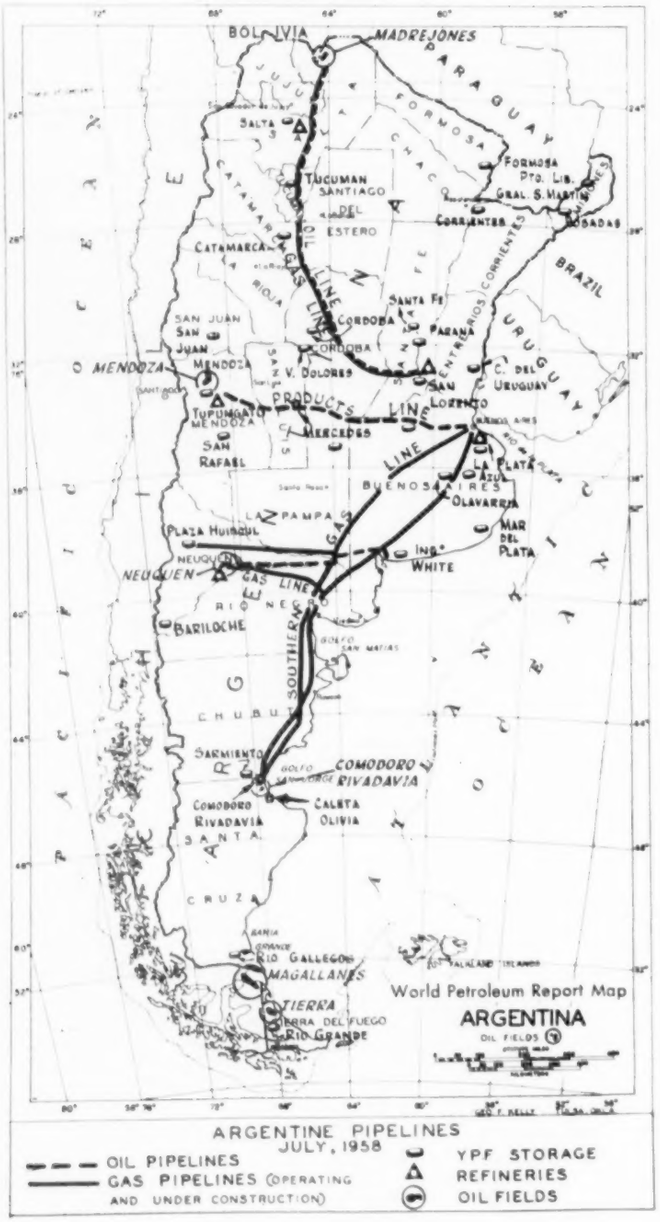

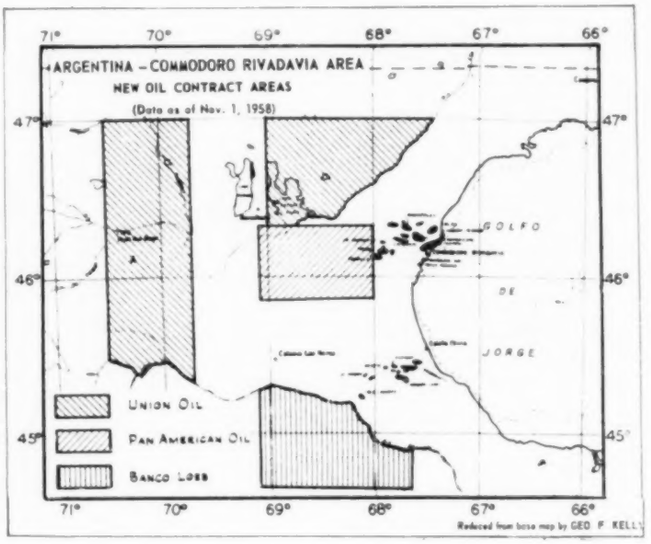

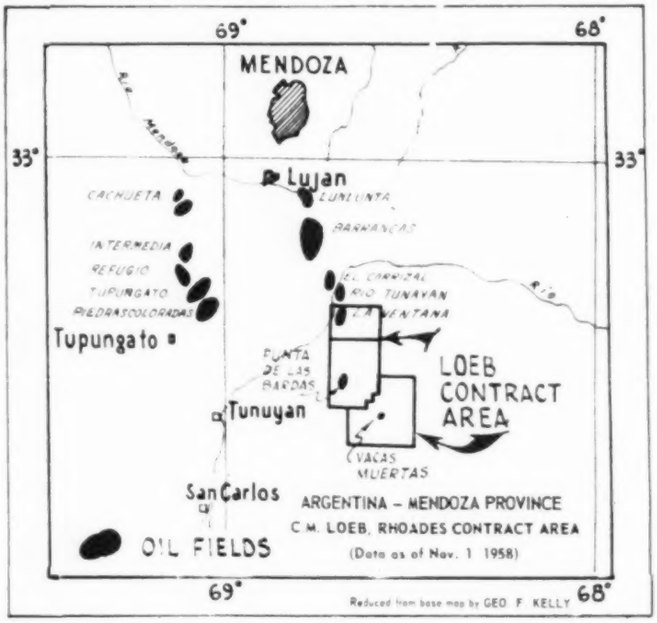

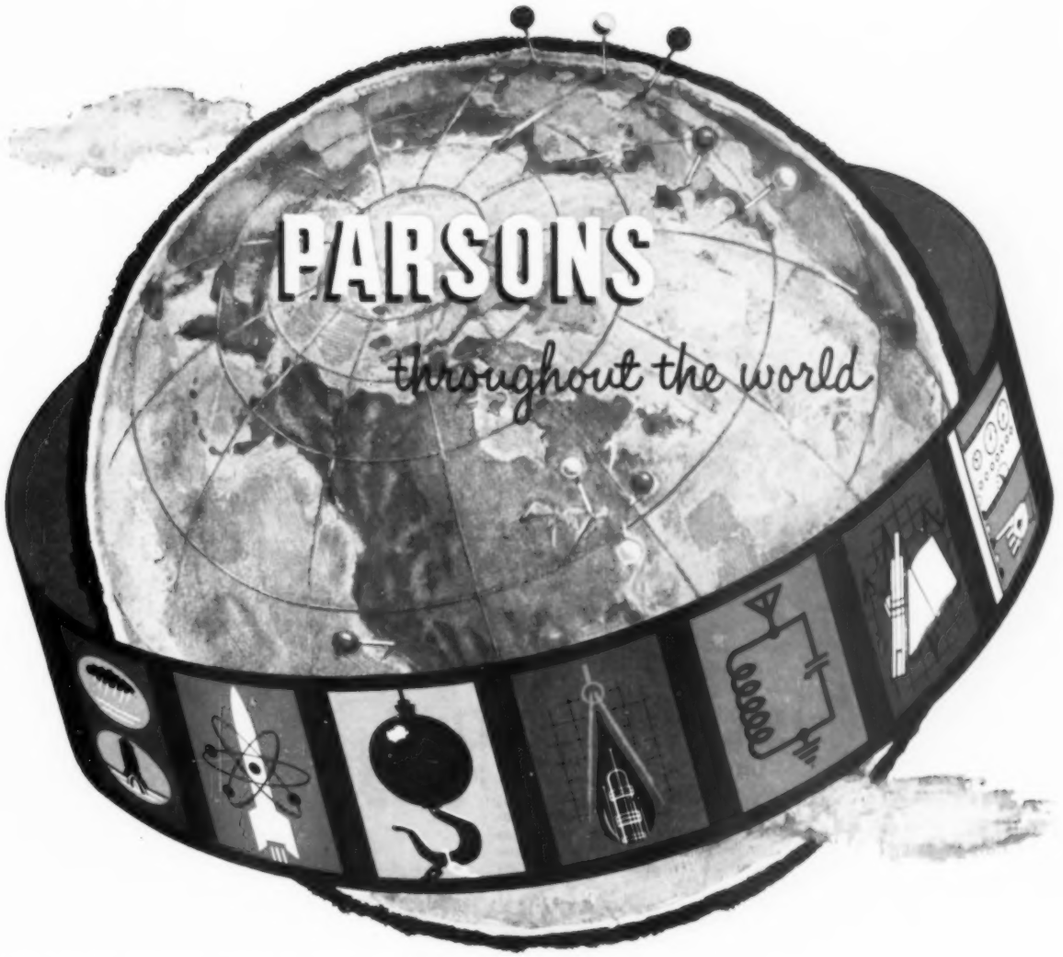

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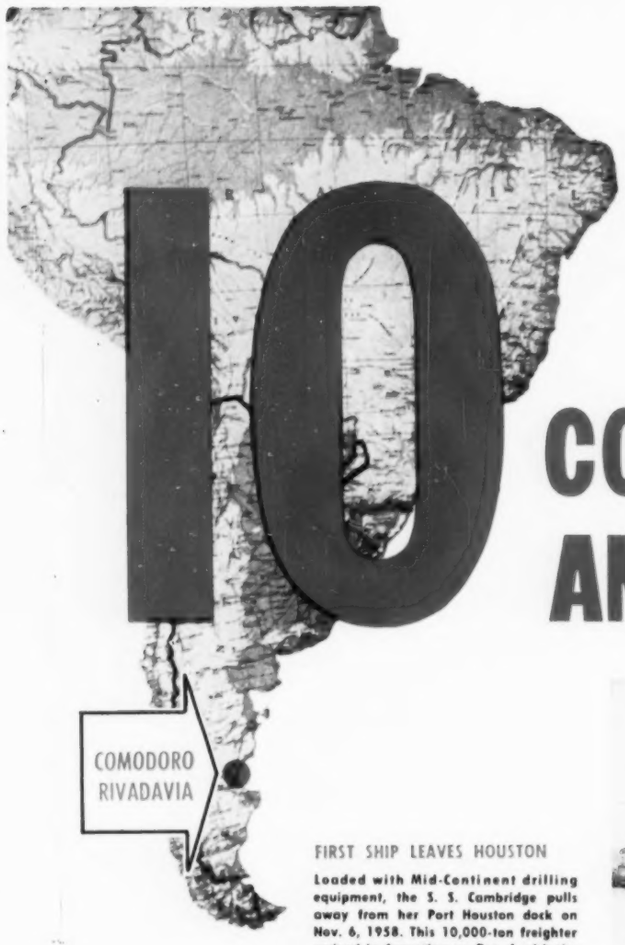


10 COMPLETE RIGS AND SHIPPED TO

Each trailer-mounted rig, capable of drilling 9,500 feet, is equipped with Mid-Continent's U-36-A drawworks, rig drives, rotary tables and blocks, Cummins diesel engines, Emsco pumps and a 126-foot Lee C. Moore telescoping mast. Rigs, specially-designed for Argentine drilling, are fully-portable.

FIRST SHIP LEAVES HOUSTON

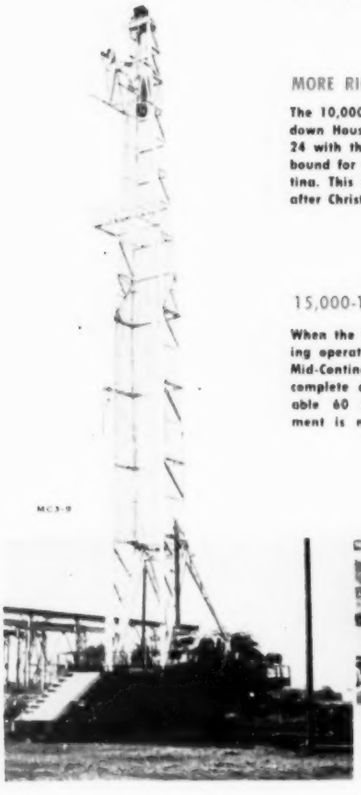
Loaded with Mid-Continent drilling equipment, the S. S. Cambridge pulls away from her Port Houston dock on Nov. 6, 1958. This 10,000-ton freighter arrived in Argentina on Dec. 4 with the first three rigs.

MORE RIGS FOR ARGENTINA

The 10,000-ton S. S. Elderfields steams down Houston's Ship Channel on Nov. 24 with three more Mid-Continent rigs bound for Comodoro Rivadavia, Argentina. This shipment was delivered just after Christmas.

15,000-TON FREIGHTER LOADS UP

When the S. S. Dorian completed loading operations in Houston on Dec. 15, Mid-Continent Supply had shipped ten complete drilling rigs in an unbelievable 60 days! Most of this equipment is now in operation.



DESIGNED, MANUFACTURED ARGENTINA IN 60 DAYS!

...proof Mid-Continent Supply gives fast world-wide delivery!

Ten complete drilling rigs designed, manufactured and shipped in 60 days! This was the delivery feat accomplished by Mid-Continent Supply Co. recently for Loffland Brothers Co. One 15,000-ton and two 10,000-ton freighters were needed to transport the equipment to Argentina, where Loffland is drilling for Pan American International Oil Co.

The rigs, specially-designed and equipped for drilling in Argentina, are diesel-powered, fully-portable units mounted on dual trailers. Mid-Continent U-36-A drawworks, rig drives, rotary tables and blocks, Cummins diesel engines, Emsco pumps and Lee C. Moore masts were supplied for each rig by Mid-Continent. Each rig package also included portable mud tanks, drill pipe, rotary hose, wire line, diesel-powered trucks, and hundreds of other items necessary for efficient foreign drilling operations.

This was one of the biggest movements of equipment ever undertaken in the oil business. It was launched with the shipment of three complete rigs just 30 days after Loffland was assigned the drilling contract. The remaining rigs were shipped in groups of three and four at two-week intervals.

The assembly and shipment of these ten complete rigs in 60 days is further proof that Mid-Continent Supply offers fast, dependable delivery of drilling equipment anywhere in the world. No matter where the job is . . . no matter how big or how small . . . Mid-Continent has complete facilities.

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petroleum, with one main pumping station; addition of other stations could double the capacity. This line, as already mentioned, will be laid and finished by Esso SAPA and transferred to YPF for operation. YPF has issued a call for tenders on the Lujan de Cuyo-Buenos Aires-La Plata 1,050-km 10¾-in. oil and products pipeline, with seven pumping stations. Capacity of line will be 39,800 b/d of petroleum, and it will start operating with three pumping stations only. It is to transport daily:

	Barrels Per Day
Liquid propane	975
Liquid butane	1,470
Gasoline	8,500
Tractor oil	2,170
Gas-diesel oil	10,150

or a total 23,265 b/d of petroleum products.

Work is actively going forward on the gas-line project let to the TIPSA group. Construction of both pipelines is managed by SARGO SA. A 24-in. gas line will run from Buenos Aires to Campo Duran. Along the same right-of-way a 12¾-in. crude and products line will join the Campo Duran and Madrejones oil fields on the Bolivian border with the refinery and tank farm at San Lorenzo. Construction of this line, already finished up to December, has been awarded by SARGO to Techint, which also built the first two sections Campo Duran-Embarcación and to Tucuman.

YPF Tanker Fleet: YPF reports its tanker fleet at 31 vessels as of 1/1/1958. With a total tonnage of 35,000, it had gross receipts in 1957 of 799 million pesos.

In 1958 YPF called for bids on oil tankers in order to increase its river and sea-going fleet. Esso and Shell are operating their own river fleet.

REFINING: Total oil-processing capacity of local refineries (including 1957 expansion) amounts to 243,000 b/d. Crude runs to stills in 1957 totaled 210,000 b/d, or 87% of capacity. Runs for 1958 are estimated at 230,000 b/d, 97% of present capacity. 55% of crude processed was imported mainly from Venezuela and the Middle East. Of a total 42 million barrels imported crude, 25,600,000 were from Venezuela and 12,500,000 from Kuwait. Early estimates for 1958 reduced this proportion to 47%, but present figures bring imports to the same level as in 1957. The increase in refining by private companies was at the expense of imported oil. These figures and the trend of future consumption—bringing it to a minimum of 16.5 million tons of oil-equivalent by 1962—show emphatically that refining capacity in Argentina must be increased substantially.

One private company (Esso) has under construction a 47,000-bbl pipe still, completion expected by early 1960. YPF has given M. W. Kellogg an order for its Lujan de Cuyo refinery expansion which will bring daily processing capacity to 42,000 bbl.

The State (YPF) company also is planning to build a 38,000 b/d refinery in Bahia Blanca to run on Neuquén crudes. The new refinery—designed mainly for liquid-fuel production—will have topping, thermal cracking, and LPGas-recovery facilities.

Oil refiners in Argentina are carrying out modernization programs. Among programs under way may be mentioned the methylethylketone dewaxing plant under construction at the refinery of Diadema Argentina, in Dock Sud. Esso Standard has completed its project for a 13,000 b/d cat-cracker. Esso Standard has already issued a call for tenders for engineering in the USA, and expects to start procurement the first quarter of 1959. The new cat-cracker is expected to be operating by 1961. Also should be mentioned the YPF lube plant with a capacity of 120,000 tons per year (2,400 b/d). This plant is to be located at the San Lorenzo refinery. Construction is expected to get started in the second half of 1959, with a completion program of approximately 24 months. Catalytic reforming units are being planned by private oil refiners and YPF. YPF has also awarded engineering and construction of a Platformer, with a capacity of 6,700 b/d, to Lummus Co. to be erected in San Lorenzo. Unit is to have a Udex aromatic extraction plant with a capacity of some 3,000 b/d. It is expected to have a cat-reformer operating in the first half of 1960. The need for reforming units is pressing. Gasoline marketed in Argentina during 1957 had an average octane rating of 72—with some premium grades ranging up to 78.

Mention should be made of petrochemicals, especially the 3,000-ton-per-year polystyrene plant begun in 1957 by Monsanto, located in San Nicolas, less than 100 miles from the great consuming center of Buenos Aires. Koppers (Industrias Plasticas Argentinas Koppers) has already started operating its 3,000-ton polystyrene plant near Villa Elisa, less than 50 miles from Buenos Aires. Electroclor (ICI) is building a polyvinyl chloride plant in the vicinity of its Juan Ortiz electrolytic soda-chlorine plant 10 miles north of Rosario. This plant will use acetylene from calcium carbide. Completion is expected during 1959. Monsanto, in Mendoza, started construction of a 5,000-ton-per-year PVC plant—starting with acetylene from calcium carbide. INDUPA (Pechiney) has far advanced its project for a 3,000-ton-per-year PVC plant in its electrolytic caustic-chlorine plant in Rio Négro; it will also use acetylene from calcium carbide produced by a Pechiney subsidiary. Industria Electrometalurgica Andina SA Atanor, now producing methyl alcohol from wood coal, is planning enlargement of its methyl alcohol production—using as raw material natural gas from Campo Duran. Projects for this plant are well advanced.

NATIONAL FACTORS

Political Attitude: 1958 saw the newly elected president, Arturo Frondizi, make a complete political about-face and welcome the oil companies. At the root of the about-face lies the economic situation. Perón left the country a complete shambles, politically and economically. Central to the problem is the lack of fuel and power, which is a major hobble on the Argentine economy. An item of immediate priority is, therefore, the domestic development of oil.

With the stagnation of investment, inflation has come as an inevitable consequence. Prices rose about 30% in 1957, and more in 1958. The currency is in a steady decline. An International Monetary Fund report recommended in October 1958 that Argentina take aggressive measures immediately.

Frondizi in his first presidential address pointed out that imports of crude and products were $318 million in 1957, and that self-sufficiency in liquid fuels is the shortest path to recovery. He took over personal management of YPF and appointed a personal delegate, Dr. Arturo Sabato; and, through his Secretary of Economy, negotiated contracts for increasing oil production in Argentina with the help of foreign capital and know-how.

YPF Powers Increased: The government has increased substantially the powers of YPF, its oil monopoly; in fact, these increases in YPF's powers are the basis of the new contracts. These powers make YPF responsible in fact only to the president of Argentina.

Politically, President Frondizi appears to be gaining the upper hand, but is losing lower-class support. A strike during the first 19 days of November, by employees and laborers of YPF in the Mendoza area, was staged as a protest against the oil contracts. It is indicative of the nationalistic sentiment of the country, even though it ended without major incident.

YPF's budget for January to October 31, 1958, amounted to 14,487,799,123 pesos of expenditures, against its income of 12,947,199,123 of income.

Labor: One of the most perplexing problems of the industry is the labor situation. Under the Péron regime, labor became accustomed to having its demands fulfilled without hesitation—and, when the pinch of inflation hits, violence erupts. In the first half of 1958, 620 strikes affecting 1,654,000 workers cost Argentina 50 million working hours.

MARKETING: 1957 consumption was more than 12.97 million tons of oil-equivalent, about 7% over 1956 consumption (12.12 million)—this increase due mainly to heavy distillates and residual fuel. Gasoline consumption has remained practically stagnant since 1954. A government decree in 1958 increased the price of gas by 0.20 peso per cubic meter consumed. A new increase in price, to take place in 1959, has already been announced. Rumors persist of a new increase in prices of liquid and gaseous fuels which will more than double present levels.

Royal Dutch-Shell has extended Argentine government $50 million oil-imports credit in order to retain its 20.1% share of Argentine market. The credit, announced by the government, was available as of January 1, 1959, repayable in sterling, 5% annually.

OIL LAWS*

During 1958 the country was opened up for investment by international companies for the first time, as the resumés contained in this section show. Argentina also passed a new oil law, the principal effect of which was to reserve the subsoil to the federal government instead of to the provinces (see *World Petroleum Report—1958* for a discussion of the provincial rights and for a brief summary of the existing oil law.)

Argentine Oil Law Amendments*—1958: On November 11, 1958, the Argentine senate approved the administration's petroleum nationalization bill as amended in the Chamber of Deputies. Promulgation of the law by the executive power was carried out in December, as were also the new status and organization of YPF with a board of directors of 14. The new petroleum bill, which reserves development of oil to the federal government instead of to the provinces as formerly, has been passed by the lower house. Vote was 98 to 0, with the opposition party abstaining. It awards provinces 12% of oil or gas extracted or 50% of net, whichever is higher. YPF is made sole agent for exploration. Translations of this law and of all new and proposed oil contracts are kept on file at the offices of *World Petroleum Report*, 604 Fifth Avenue, New York 20, N.Y. For space reasons, only the major contracts concluded are summarized in this report.

* Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Report Legislation*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

C. M. LOEB, RHOADES & CO.—YPF CONTRACT SUMMARY

Contract signed July 20, 1958, between Yacimientos Petroliferos Fiscales, hereinafter referred to as YPF, and Carl M. Loeb, Rhoades & Co., hereinafter referred to as the Bank. Bank to afford all financial requirements necessary for operations; Bank to be repaid from value of increased production

ARGENTINA *(continued)*

starting 12 months after production (Art. 1). **Area:** See map. **Financing:** Bank will meet all expenses necessary, estimated at at least $100 million over period of contract (Art. 4). **Operations Committee:** Within 30 days, will set up operations committee of four members, two from each party. All decisions are to be by majority vote. In case of tie, chairman of committee has deciding vote. Chairman of committee appointed by Bank during period there are unreimbursed accounts due to Bank. **Delivery of Oil:** YPF will take immediate delivery of all oil offered, and Bank will finance and direct construction of transportation facilities from delivery points onward (Art. 10). **Payments:** Payments to the Bank will be limited to stated percentages of the value of foreign exchange saved as a result of production under contract (Art. 11). Every month YPF will pay Bank an amount equal to 50% of the value of exchange saved. In addition, YPF will pay money equivalent to 20% of exchange savings; however, this 20% can be reduced to a maximum of 15% by reduction for production over 25,000 b/d. Payments shall be made for 20 years from "full development of the structure." All payments made in US currency except expenditures, which will be paid in Argentine pesos (Art. 16). If YPF does not accept all petroleum tendered, payments will nevertheless be calculated on amount tendered (Art. 19). The Central Bank guarantees exchange availability. Industrial Bank guarantees compliance with all YPF payments (Art. 21). **Taxes:** YPF will pay all taxes. **Cancellation:** In event of annulment, YPF shall continue to pay as specified in contract for wells existing on annulment date (Art. 27). **Guaranty:** Bank must deposit guaranty in a New York bank equal to 5% of estimated cost of the program. (*Source: World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N. Y. Translation of original kept on file; see p. 22 herein).

UNION OIL CO.—YPF CONTRACT

Contract is between YPF and Union Oil Co. of California. **Area:** See map. **Drilling:** From second year, Company shall commence drilling. Company must spend US $5 million in first two years; thereafter a minimum of US $3 million. In any event, the minimum expense shall be US $8 million. **Production:** YPF may not limit production (Art. 4). **Pipelines:** Company is to construct one or two pipelines if there is marketable production. **Duration:** 15 years. Option to extension for five years. **Sales to YPF:** YPF pays Company US $12 per cubic meter of petroleum produced and delivered; 60% in US dollars, 40% in pesos. YPF pays for all taxes. **Price:** Proportionate to the international price. Payment at free foreign-exchange rate. **Dollar Guaranty:** The Central Bank of Argentina guarantees YPF dollars required and guarantees right of transfer abroad. **Exports:** Company has a preferred right to exportable surpluses of YPF. **Transfer:** Any time with consent of YPF. **Renunciation:** If prevented from carrying out contract, YPF must pay indemnity, plus a sum equivalent to the total recoverable reserves less investments. (*Source: World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N. Y. Translation kept on file; see p. 22 herein).

PAN AMERICAN—YPF CONTRACT SUMMARY

Scope: Total 150 wells drilled, using pipeline to Comodoro Rivadavia. **Production:** Company will deliver amounts produced to YPF (Art. 8), who must accept all of it or pay for entire amount tendered. **Payment:** YPF pays Company $10 per cubic meter ($1.59 per bbl); 60% in dollars, 40% in pesos (Art. 9). YPF assumes complete liability for all taxes (Art. 10). The Central Bank of Argentina guarantees YPF the dollars to pay and guarantees Company free transfer of same. **Crude Imports:** On third contract year, Company receives preferential right for supply of one-third of crude imports by YPF, based on 1957 amounts (Art. 16). **Duration:** 15 years, with option of 5-year extension. **Surrender:** Company may surrender C. Dragon and C. Grande and retain Anticlinal Grande, or vice versa, in which case obligated to use only five drilling rigs and drill total only 50 wells (Addenda, Art. 4). (*Source: World Petroleum Legislation Report*, 604 Fifth Avenue, New York 20, N.Y. Translation on file; see p. 22 herein).

ESSO-YPF CONTRACT SUMMARY*

Date of Signing: December 3, 1958 **Duration:** 30 years. **Area and Reduction:** 1,853 square miles in Neuquen; to be reduced to 50% at end of 6th year and to 25% at end of 10th year, retaining one or more parcels. **Investment:** Minimum of $10 million in exploration and production during first three years; $13 million during next three years; $24 million on 50% of area during next four years if reserves and markets support production of 25,500 bbl per day (if not, investment reduced proportionately); during final 20 years investments as necessary to complete exploration and development of area then remaining. **Drilling Obligation:** No obligation other than minimum investment. **Surrender:** At end of any of first three periods, on 60 days' written notice. During final 20-year period, on one year's notice. On surrender or termination, all works and fixed installations become property of YPF, and YPF may purchase moveable equipment. **Delivery of Petroleum:** Producing at maximum efficient rate, company shall deliver all petroleum, except that required for operations, to YPF. YPF shall take all deliveries until national self-sufficiency is achieved; thereafter, amount not taken must be in fair proportion to company's total production compared with that of other companies. Company may buy surplus from YPF at a price in pesos which will give the company a reasonable profit, or may export it paying YPF the difference between proceeds of sale and the fee company ordinarily receives, plus transport and other charges. **Payments:** Each month the peso equivalent of $11.50 per cubic meter ($1.83/bbl) for up to 12,600 b/d; $11.25 per cubic meter ($1.79/bbl) for volume between 2,000 and 4,000 cubic meters per day (25,200 b/d); $11.00 per cubic meter ($1.75/bbl) for over 4,000 cubic meters per day; plus interest in event of late payment. Fee adjusted with average of Venezuelan, Persian Gulf, and Gulf Coast posted prices for equivalent crude. All sums not required locally for company's operations may be freely remitted abroad in dollars. All conversions at free market rate. **Taxes:** YPF shall reimburse the company or pay directly on receipt of pertinent invoice all import duties, taxes, etc. (but not "social charges" such as pension contributions, etc.) levied on operations and profits under this contract. Obligation shall be satisfied on delivery to company of proof of payment. **Contractors:** Company may carry out operations directly or through contractors. **Pipeline:** Company to spend up to $23 million constructing pipeline having initial capacity of 23,300 b/d from Challaco to Bahia Blanca. To begin when company feels it is economically justified, unless YPF requires earlier commencement. YPF may finance portion of work in pesos. On completion, to be turned over to YPF which will reimburse the company by 30 equal annual installments, plus 5% interest, in dollars. Central Bank assures availability of dollars. **Surface Rights:** Easements, etc., obtained by YPF for company's account. Cost of pipeline right-of-way for YPF account. **Natural Gas:** Company and YPF shall agree on its development and utilization. **Reports to YPF:** Summaries of geological work, drilling information, production; also annual program, contractors names, etc., required. **Esso's Properties:** Cedes to YPF its Salta properties along with fixed installations and camp at Tartagal. Properties and camps in Neuquen (but not Dadin refinery) will be ceded on termination of this contract. **Esso's Market Position:** Shall "not be limited to one lower" than the proportion of market supplied during May 1957-April 1958.† May purchase from YPF a share of any surplus petroleum proportionate to Esso's relative position in the market. May import any further requirements if above share of YPF surplus is insufficient to maintain market position. **Export Right:** If surplus production and government should authorize export of petroleum, the company, under the legal provisions then in force, may export excess crude from its area.

† Reported to be 16.1% of Argentine market.

SHELL-YPF CONTRACT SUMMARY

Date of Signing: December 3, 1958. **Duration:** 30 years. **Area and Reduction:** Approximately 11,500 square miles in Buenos Aires and Rio Negro provinces. To be reduced within three years to 70%; within five years to 50%; within seven years to 25%; and within 10 years to 10% of original area. Parties may agree to waive any single reduction by payment of an amount to be agreed upon. **Investment:** Minimum of £1 million in first two years; £2 million in following three years; £3 million in next three years; and if justified, £4 million in next two years. **Drilling Obligations:** Commence exploration within 60 days; on finding structure with possible oil accumulation, company must notify YPF within 15 days and begin exploratory drilling; will draw up development program with YPF and continue drilling to obtain maximum efficient production. **Surrender:** At any time on 60 days' written notice to YPF, provided company has completed works in progress and made minimum investment for corresponding period or pays YPF unspent balance. On surrender or termination, all fixed installations become property of YPF, and YPF may purchase moveable equipment. **Cancellation:** After notification of YPF of breach of contract on improper operations, parties have 30 days in which to reach accord before arbitration. If, after arbitration, company doesn't remedy breach, YPF can request total or partial rescission of contract, the company losing its installations and investment in area affected. **Delivery of Petroleum:** (a) A quantity of oil equal at the international price in value to the company's direct and indirect expenses . . . including amortization of equipment, materials, works, installations, financial charges, etc. shall ("on behalf of YPF") be sold for pesos to Diadema and Shell Argentina to be refined and marketed locally; the proceeds will repay company for such expenditures. (b) 10% of remainder to be turned over to YPF until such time as its value at international price totals equivalent of £1.5 million. (c) Of the balance, 50% to be turned over to YPF and 50% to be sold to Diadema and Shell Argentina for refining and sale within the country; payment in pesos at the international price to Shell will be "as compensation for the exploration and production investments, risks, interests, and profits." **Export Rights:** If above consignments to Diadema and Shell Argentina exceed their needs for maintaining their percentage of the domestic market, excess will be sold to YPF or, in event government authorizes export, may be exported. **Taxes, etc.:** YPF will pay all taxes, overriding royalties, etc., levied on operations and profits under this contract; also all import duties (but company must give preference to local products of equal quality, etc.). **Pipeline:** Company will construct and operate a pipeline if one is economically and technically justified; parties will decide details re such. **Surface Rights:** Free use of public lands; charges for use of private lands (which may be obtained by YPF) shall be for company's account. **Natural Gas:** If discovered in commercial quantities, parties will establish plan for its development and utilization for company account, or company will transfer facilities to YPF which shall reimburse company for all costs incurred. **Reports to YPF:** Of geophysical, drilling results; also annual program. **Arbitration:** If no agreement by negotiation, arbitration by panel of three members, one chosen by each party and the third, if parties cannot agree, by the President of the Supreme Court. **Further Guarantees:** If as a result of any act (or omission) by YPF or any national or local government authority the company is prevented from continuing the normal development of its operations, company may request arbitration for rescission of contract, and YPF will pay "all damages arising from such rescission, including . . . the total market value of the company's investments in the republic to the time of such rescission and the profits it would have received." Suspension of company's obligations during period of *force majeure* and extension of duration of contract accordingly. **Shell's Market Position:** When amount of oil received under this contract is insufficient for Diadema and Shell Argentina to maintain a position of 20.1% of the domestic market, the government will grant permit to import any deficiency, but at a price not above quotation offered to government or price paid by other companies for their imports. If surplus national production, Shell will meet deficiency by purchasing YPF stocks at price guaranteeing Shell "reasonable profit." **Assignment:** Only with prior written consent of YPF, unless to an affiliated company.

* Original and English translation kept on file at New York offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N. Y. (see p. 22 herein).

COLOMBIA

PHYSICAL DEVELOPMENT

EXPLORATION: Since activities reported in *World Petroleum—1958*, new oil explorers include Cities Service (Colcito); Sun Oil Co., jointly with Pure and United Carbon; Amkirk Petroleum Corp., of Fort Worth, Texas, on the 15,000-hectare Floresanto block; An-Son Petroleum Co. and United Fruit Co., which took over the Lebrija block; and John W. Mecom. (For a concession map of Colombia, which is generally hard to find, see *World Petroleum Report—1958.*)

Cities Service, on its 2.2-million-acre farmout from Empresa Colombiana de Petroleos (Ecopetrol), the government's oil enterprise, completed two discoveries in 1958. Chucuri No. 1, south of Barranca, was a small producer on the pump. It has since been abandoned as noncommercial. Chucuri No. 2 was drilling (as of December 15, 1958) 1¼ miles northwest of No. 1. In the old Las Monas area (now known as Aguas Claras), Cities Service during 1958 brought in wildcat Aguas Claras No. 1. At 6,716 ft, the well produced 431 b/d of 29.6 API oil on a ⅜-in. choke. (It has since settled down to 100 b/d to 300 b/d.) It is not certain yet whether the well is commercial. At year-end Aguas Claras No. 2 was drilling, 1,100 ft northeast of No. 1.

Shell's Penas Blancas, a wildcat offsetting Cities Service's Chucuri No. 1, during 1958 went to 7,746 ft in basement, and produced some 400 b/d of 21 API oil on the pump. Shell also had a discovery in the Yondo block. Taken to 8,195 ft, it was completed for 600 b/d of 31.5 API on a ¼-in. choke.

Since the beginning of 1958, two wildcats have been drilled and abandoned in the Sinu by Mobil Oil de Colombia. They were:

Well	Completed	Comment
Cordoba-1	May 23, 1958	On Mobil-Intercol acreage
La Mora-1	May 18, 1958	Farmout drilled by Sun on Mobil-Intercol acreage

Mobil's program for the remainder of 1958 included a joint seismic survey to continue in Llanos. Mobil-Intercol wildcat La Rada No. 1 in Sinu, located 83 miles southwest of Cartagena, was spudded August 20, 1958.

In June 1958, Sun Oil Co. applied for 15 concessions covering 549,749 hectares. On its farmout from Mobil-Intercol, Sun during 1958 completed two wells on the Caribbean coast. La Mora No. 1, spudded, February 11 in the Sinu area, was taken to 8,800 ft and abandoned May 18. Coloncitos No. 1, spudded on June 25 near Cartagena on a farmout from International Petroleum, was abandoned at 9,508 ft in September. Sun spudded its third wildcat late in November, onshore in the Golfo de Uraba, westernmost part of Colombia's Caribbean coast. No drilling had been done in that region previously.

On November 20, Amkirk Petroleum Corp. spudded Morrocoy No. 1 on the Floresanto block. An-Son was both operator and drilling contractor on the Lebrija block. John W. Mecom, who abandoned his former agreement with Ecopetrol (see *WPR 1958*, p. 111), will enter a new deal, and will drill jointly with the government enterprises near Toluviejo on the coast. And European interests have formed Intercontinental Petroleum Co. to acquire oil properties in Colombia.

Other wildcatters during 1958 included Richmond Petroleum Co. (Standard of California affiliate) in Cordoba and Bolivar; Intercol in the Upper Magdalena valley; Intercal, Shell, and Texas Petroleum in the Llanos, the vast region 600 miles from Caribbean tidewater. Texas Petroleum, first to file in the Llanos is 1937, expects to drill a Llanos test during 1959 on its No. 44 Guavió concession, about 65 miles east of Bogota. Geophysical crews must use helicopters in this remote region, which has had some oil shows but no commercial pool yet. Other 1958 wells by Texaco include: Corcovado No. 1, located in concession No. 598, was drilled to 13,351 ft and abandoned on February 27, 1958. Buena Fe No. 1 was drilling at 5,590 ft on September 1; it is located in San Sebastian concession No. 175.

PRODUCTION: Colombia's oil production in 1958 averaged about 129,000 b/d; about the same in 1957. This was obtained from 23 different oil fields by five operators. Including natural-gas liquids, petroleum production averaged 131,993 b/d in August 1958, and is expected to rise in 1959.

Wells drilled in Colombia from 1907 to January 1, 1958, totaled 3,115. Of these, 373 were wildcats—55 oil, 4 gas, 314 dry. Of the 41 pools discovered in a half-century of exploration, 23 proved commercially successful.

Exclusive of preliminary geological and geophysical expenditures, present wildcat drilling averages $55 per foot for a 7,300-ft well. Overall expenditures run from $350,000 to more than $700,000 per well—averaging in excess of $400,000 per wildcat.

COLOMBIA—Crude-Oil Production, 1958
(Barrels Per Day)

January	131,975	July	126,077
February	130,837	August	131,993
March	127,491	September (est.)	130,000
April	125,547	October (est.)	131,000
May	127,720	November (est.)	132,000
June	126,412	December (est.)	133,000

1958 (year) 126,670 b/d (partly estimated)

Reserves: Cumulative oil discovered to January 1, 1958, totaled 1.5 billion barrels. Of this, 790 million barrels have been produced. The balance, or some 710 million barrels, constitute Colombia's proved oil reserves.

REFINING: The accompanying table shows refineries in Colombia. Crude runs to stills totaled 18,376,296 bbl (50,346 b/d) in 1957. In the first half of 1958 they totaled 11,443,776 (64,000 b/d).

COLOMBIA—Refineries
(Barrels Per Day)

Name of Company	Plant Location	Crude Capacity	Cracking Capacity
Colombian Petroleum Co.	Tibu	2,200 S	—
Empresa Colombiana de Petroleos	Barrancabermeja[1]	37,500 Comp.	19,280C
	La Dorada	4,200 S	—
International Petroleum (Colombia) Ltd.	Cartagena	26,100 SC	25,000C
The Texas Petroleum Co.	Guamo	1,100 —	—

[1] 16,500 b/d vis-breaking; 1,200 b/d H_2SO_4 alkylation; 175 b/d lube plant; 962 b/d asphalt.

S—Skimming. Comp.—Complete. C—Cracking. Under cracking capacity: C—catalytic.

MARKETING: Colombia's inland requirements are supplied almost entirely by indigenously produced oil. Of current production, Colombia consumes 47,000 b/d. The balance, or about 82,000 b/d, is exported.

TRANSPORTATION: As of January 1, 1958, Colombia's crude-oil trunk pipeline had total length of 790 miles, which in 1957 had carried about 43 million barrels. Products lines totaling 460 miles carried about 12 million barrels in 1957.

OIL LAWS*

There has been no major change in Colombia's basic oil law as outlined in *World Petroleum—1958*.

COLOMBIA—GOVERNING OIL STATUTES

Controlling statutes in Columbia are listed below. Translations of statutes cited are kept on file at the office of *World Petroleum Report*, 604 Fifth Avenue, New York 20, N. Y.

Principal controlling statutes are: Decree 1056 of April 20, 1953 (the basic Petroleum Code); Resolution No. 4 dated January 5, 1953; Resolution No. 330 of April 30, 1953; Decree No. 1349 of May 22, 1953; Decree No. 1070 of April 20, 1953; Resolution No. 65 of July 17, 1953; Decree No. 2683 of October 16, 1953; Decree No. 1886 of June 18, 1954; Decree No. 2055 of July 6, 1954; Decree No. 2539 of September 1, 1954; Decree No. 2752 of September 15, 1954; Resolution No. 281 of April 18, 1955; Decree No. 2140 of August 3, 1955 (establishing new tax incentives for the oil industry); Decree No. 2390 of September 2, 1955; Decree No. 2844 of October 27, 1955; Resolution No. 777 of October 24, 1955; Resolution No. 82 of February 6, 1956; Decree No. 1262 of June 1, 1956; Decree No. 2198 of September 5, 1956; Decree No. 2040 of August 23, 1956; Decree No. 3050 of December 13, 1956; Resolution No. 58 of June 3, 1958; Decree-Law 0184 of June 4, 1958; Decree-Law 0282 of July 16, 1958; Resolution 21 of October 1, 1958; Decree-Law No. 3102 of October 22, 1954; Decree 0107 of June 17, 1957; Decree 1247 of June 18, 1957.

*Translations of the complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

NATIONAL FACTORS

The oil industry is of considerable importance to the country's economy. In 1957, oil provided $30 million in dollar exchange; and Colombia's inland consumption of 47,000 b/d from domestically-produced oil saved some $136 million in dollar exchange in 1958. The so-called 50-50 net-profits split during 1953-57 actually resulted in 60% to the government and in some instances even more. Of Colombia's 10,600 oil workers, 5.7% are foreign. Average oil wage is 2.85 pesos per hour. It is 85 centavos to 1.10 pesos per hour for other industries.

The Colombian oil industry may be moving in the direction of a nationalized industry, with concessions operated by companies under contract. This is already the situation of one company, Cities Service, in its relationship with the government's Ecopetrol.

Although relatively small, the oil industry is most important in the country's economy. It is the second in value as exporter: For 1956, oil brought $71 million in exports; and of total dollar exchange, oil brought 6.3%, second to coffee. Oil-industry investment is around $400 million. The oil industry contributes about 5% of the total fiscal income yearly. See map next page.

END

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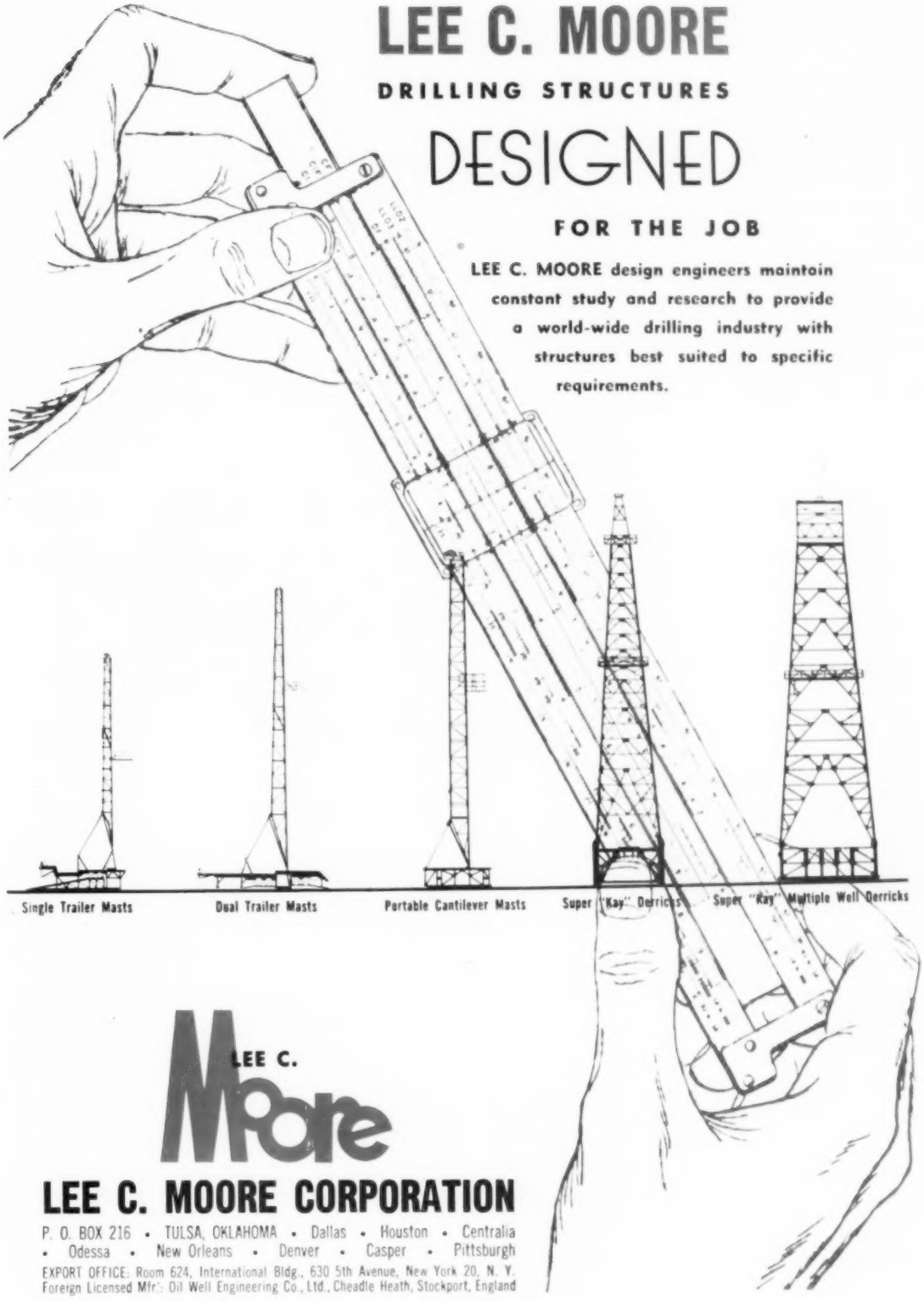

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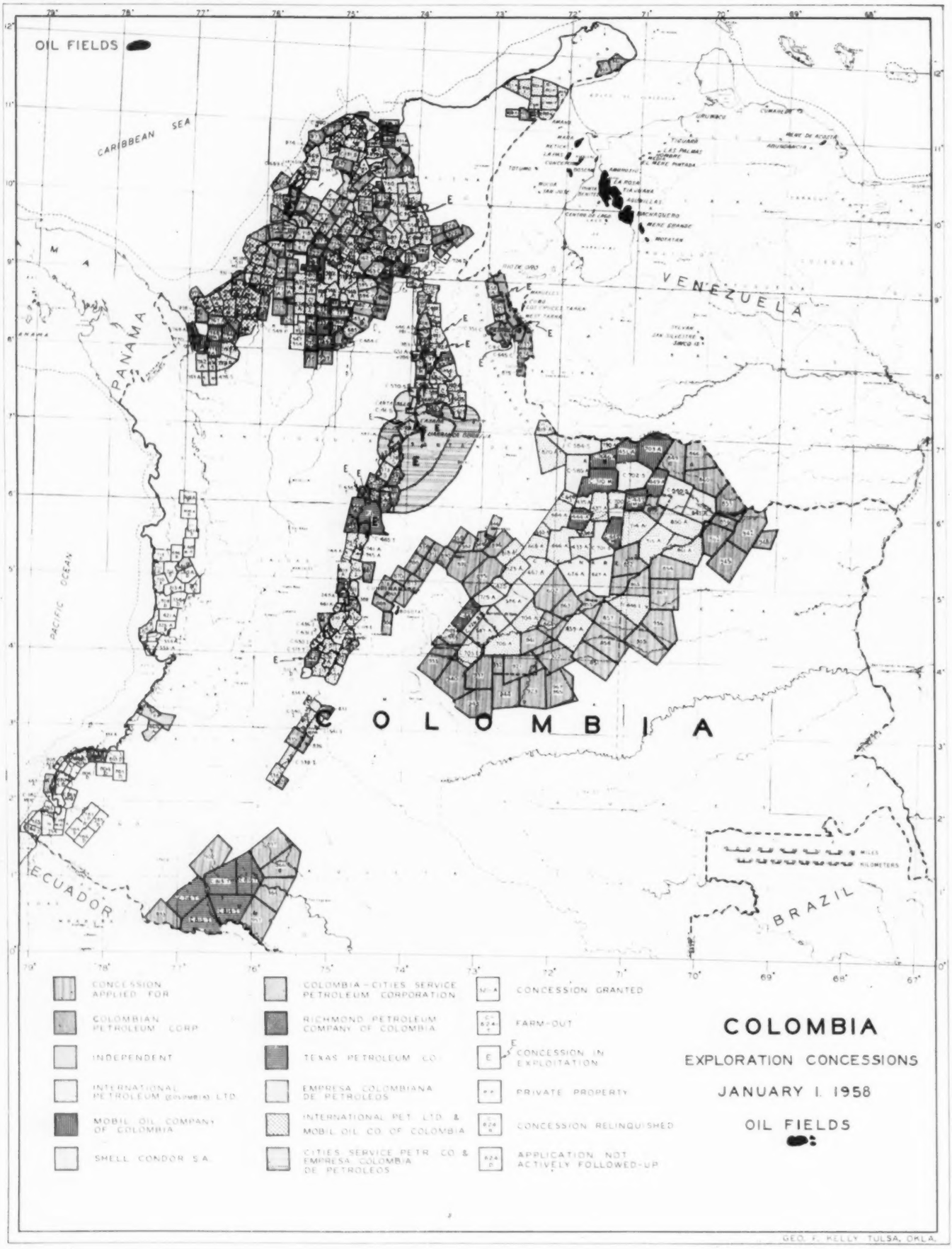
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FARM-OUT
CONCESSION IN EXPLOITATION
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CONCESSION RELINQUISHED
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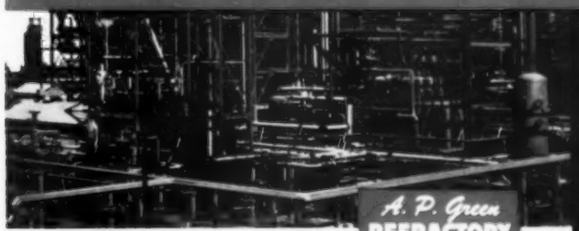

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VENEZUELA

PHYSICAL DEVELOPMENT

EXPLORATION: Venezuela settled down in 1958 to investigating the large concession grants given in 1956 and 1957. The details of those grants were given in *World Petroleum Report—1958* in detail, and are not repeated here. For a brief discussion of the geology and history of Venezuelan exploration, see *World Petroleum Report—1957.*

The more important discoveries during 1958 were those in the two extremes of Venezuela, the Gulf of Paria on the east and Lake Maracaibo on the west. In the latter, discovery has followed discovery as new concessionaires drill up their prospects. However, exploration during 1958 decreased from 1957 levels, and total wells drilled were about 1,150, compared with 1,825 in 1957. A total of 82 rigs was working at the end of 1958, including those both for exploration and development drilling.

Signal Oil and Gas Co. of Venezuela is operating in Lake Maracaibo for a group of companies which includes itself, Hancock Oil Co., The Pure Oil Co., and The Standard Oil Co. (Ohio). Signal has had outstanding success in the lake; and has a second contract barge engaged in drilling development wells in the company's Block 4. The first shipment of crude was in October through a jointly owned terminal, Punta Palmas, on the west shore of Lake Maracaibo. The companies also hold acreage along the Venezuelan-Colombian border on the northwest side of the Gulf of Venezuela. One strategic test was recently completed on these holdings.

Venezuela Sun et al. have had a series of exceptional finds. Two recent wells were completed by Venezuelan Sun group on Block No. 1, Lake Maracaibo; the two tested a total of 9,385 b/d from the Eocene. SVS No. 16, larger of the two, was a dual producer and, on ¾-in. choke, tested 3,265 b/d of 35.2-gravity crude and 5,180 b/d of 37.5 gravity. SVS No. 15 flowed 940 b/d of 35.4-gravity crude on ½-in. choke, with perforations between 8,447 ft and 8,594 ft.

Two more wells were both dual producers in the Eocene, through a ¾-in. choke. SVS No. 14 (the larger) tested 3,936 b/d of 32-gravity oil from the upper and 4,530 b/d from the lower section. SVS No. 13 flowed 4,434 b/d 32-gravity oil from the upper and 3,360 b/d from the lower zone. SVS No. 12, a dual completion in multiple Eocene horizons, tested in the upper zone 5,200 b/d of 31.6-gravity on a ¾-in. choke, through perforations between 9,090 ft and 9,385 ft. The lower zone tested 5,160 b/d of 31.5-gravity oil, also on a ¾-in. choke, through perforations between 9,415 ft and 9,570 ft. The well encountered a total of 1,250 ft of net oil-bearing sand. SVS No. 11, also in the Eocene, tested 5,280 b/d of 36.5-gravity oil through a ⅝-in. choke from perforations between 7,740 ft and 7,940 ft.

Sun encountered approximately 1,400 ft of oil sand in SVS No. 9. The well tested at the rate of 7,416 b/d on a ¾-in. choke. It flowed through perforations at intervals in a 270-ft section from 9,408 ft to 9,678 ft.

SVS No. 10 encountered about 250 ft of oil sand. It was tested a few days earlier at a rate of 4,536 b/d of 34-gravity crude through a ¾-in. choke. The well flowed through perforations in a 50-ft section from 7,850 ft to 7,900 ft. Total depth was 8,211 ft.

Sun and Venezuelan Atlantic Refining Co. each has 45% interest in Block 1. Seaboard Oil Co. has 10%.

SVS No. 8 tested at the rate of 6,350 b/d of 35.2-gravity crude through ¾-in. choke and perforations at 7,771-89 ft and 7,795-842 ft in Eocene sands. SVS No. 7, completed in the Icotea horizon, tested at the rate of 3,240 b/d of 33.9-gravity oil through ½-in. choke. Three previous wells on the block were completed for 500 b/d, 7,080 b/d, and 6,063 b/d.

Phillips Petroleum group had a wildcat discovery at No. LSG-O-1. It produced 4,080 b/d of 24.8-gravity crude through ¾-in. choke on a final production test from the Eocene. Phillips said no test was made through open tubing, but gave no further details. The wildcat was drilled

VENEZUELA — Drilling in 1958
(All companies)

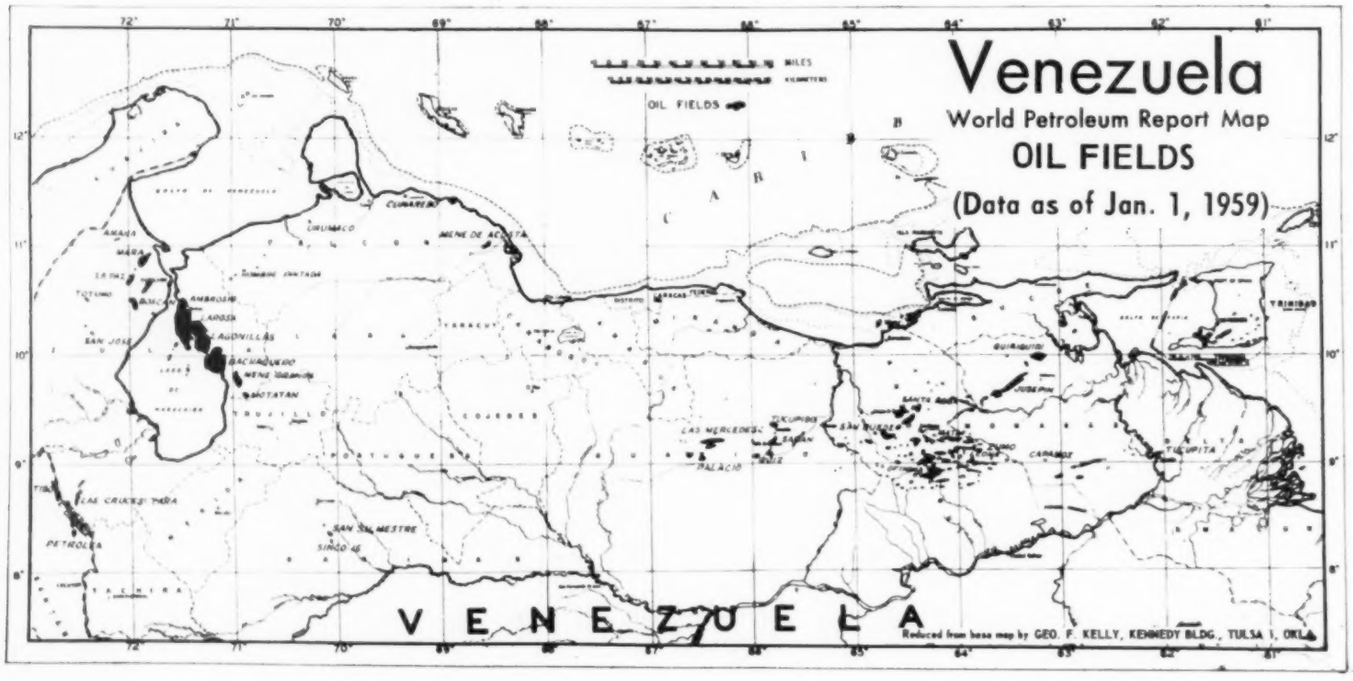
1958	Wells Completed or Abandoned		
	Wildcat	Other	Total
1st quater	60	224	284
2nd quarter	42	252	294
3rd quarter	32	219	251
4th quarter (est.)	46	215	261
	180	910	1,090
Suspended (est.)	30	30	60
	210	940	1,150
1957	138	1,601	1,739
Suspended	36	53	89
	174	1,654	1,828

in the northwest corner of Block 10 (now called Santa Maria) at mid-lake. The tract is held 45% by Phillips, 25% by the San Jacinto group, 10% each by El Paso Natural Gas and Western Natural Gas, and 5% each by Sunray Mid-Continent and Pacific Petroleums Ltd.

Participating in Block 17, scene of a more recent discovery, are Phillips Petroleum Co., the major-interest owner and operator, Sunray Mid-Continent Oil Co., Ashland Oil and Refining Co., Kerr-McGee Oil Industries Inc., Western Natural Gas Co., El Paso Natural Gas Co., Pacific Petroleums Ltd., and Canadian Atlantic Oil Co. Phillips announced "initial oil production" on Block 17 in October. No flow rates were disclosed. The well was the second drilled on Block 17. The first, LPG 17-1 on the northern edge of the concession, was a dry hole. The new producer is 5½ miles southwest of the nearest production, Cia. Shell de Venezuela's VLE 196-X on Block 7. Shell has said nothing about this test or another well in the western part of the block. But reports indicate VLE 196-X at 13,038 ft, and VLE 198 at 14,122 ft, are both making over 2,000 b/d on tests.

To the north of Sun, Superior completed Lama 10 dually, with the upper zone of from 9,080 ft to 9,338 ft testing 5,346 b/d. The lower pay, 9,452 ft to 9,525 ft, tested 4,925 b/d. Both

(Continued)



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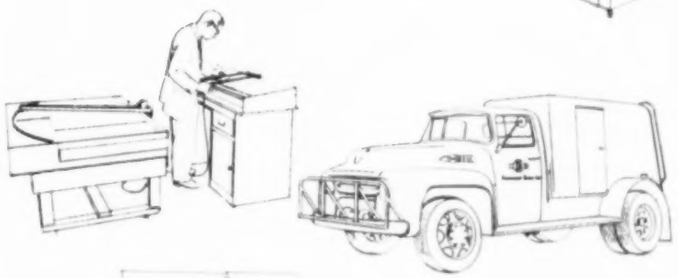

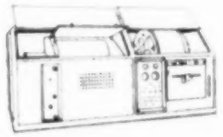

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tests were on ¾-in. choke, and the crude ranged from 31.9- to 32.4-gravity.

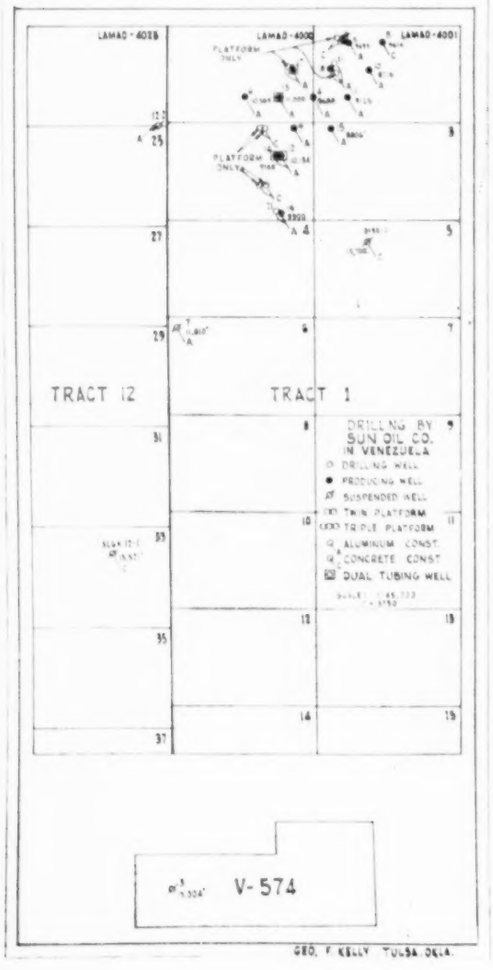
Offsetting Mene Grande's Ceuta field, a group of newcomers headed by San Jacinto Oil Co. completed its fifth Mariago well. It tested 3,768 b/d of 25.7-gravity crude. San Jacinto's partners are Union Oil, Murphy Corp., Monsanto Chemical, Tennessee Gas Transmission, American Petrofina, and Sharples Oil.

Paria Operations Inc. has Venezuela's first offshore producer in Posa 112-1 well. "Substantial" amounts (reportedly 1,500 b/d) of 20-gravity crude were recovered in drill-stem tests of two zones below 4,000 ft. Paria Operations is held ¼ each by Continental, Texaco, and Ohio Oil; ⅛ by Cities Service; and ½ by Richfield. The second well drilled was Posa 103-A-1, four miles northwest of the Posa 112-1 discovery. It was given up at 12,626 ft because it was impossible to correlate the test with the discovery. Casing had been set below 11,000 ft. The rig was moved to another platform 8½ miles farther northwest for the third wildcat.

Richmond Exploration Co. (Standard of California) has established production in western Zulia. Richmond's 36-E-2 is in Cretaceous pay which yields 31-gravity crude from below 15,600 ft. Initial drill-stem tests flowed 3,290 b/d on a ⅜-in. choke. A later production test produced slightly less than 1,900 b/d.

After drilling one exploratory test, Creole gave up 98,800 acres along the Colombian border.

A second company—Shell—surrendered concessions along the Colombian border which it had been required to take in 1956.



Two Creole offsets to Superior Oil Co.'s very prolific block of national-reserve acreage have been completed for good wells. Creole has another 20 locations planned which it believes will be productive.

Pancoastal Petroleum Co. and Venezuelan Atlantic Refining Co. have a new oil discovery on their jointly owned 6,200-acre Pirital concession in the Punta Gordo area, eastern Venezuela. After an initial test, the new well, Pirital No. 6, was placed on pump with a production of 240 b/d of 19-gravity crude through perforations from 1,210 ft to 1,280 ft. Construction of a feeder line to nearby pipeline facilities is now under way.

Pancoastal and Venezuelan Atlantic, the operator, have also completed the 5th producing well in the recently discovered Aguasay-Caro field.

Sinclair announced in August a triple-zone completion of a development well in its Aguasay field in eastern Venezuela. Total combined initial production from the three sands amounted to 1,764 b/d, the company said. The producing zones are at depths of 12,066-68 ft, 12,166-72 ft, and 12,390-400 ft.

Pan Venezuelan Oil Co. released two rigs drilling in southern Monagas, and has been re-evaluating its properties. Four dry holes have been drilled since November. Two of the wildcats were located on Block 11, and one each on Blocks 28 and 30. The three concessions cover 70,800 acres, for which Pan Venezuelan paid more than $35 million.

Sinclair Venezuelan Oil Co. completed, early in 1958, a new wildcat well in northeast Anzoategui, Venezuela. No. 1 Rosal, located seven miles north of the Santa Rosa field, flowed at the rate of 497 b/d of 41.8-gravity oil from perforations at 12,013 ft to 12,019 ft, and at the rate of 734 b/d from perforations between 12,406 ft and 12,410 ft.

Venezuelan Atlantic Refining Co. has abandoned Paez 2, its second test in Barinas, as a dry hole at 9,478 ft. Paez 1 was a duster at 9,358 ft. The only other well yet drilled on the newly acquired Barinas blocks was Creole's Lechozote 1. It also was dry.

PRODUCTION: Production in Venezuela during 1958 was 2,604,840 b/d, a drop from 1957's record levels. Import restrictions were blamed for much of this, but were only responsible for part of the decline. Other contributing factors were the re-opening of the Suez Canal, warmer weather than usual, and the decline in USA economic activity.

Considerable support was given to Venezuelan production during 1958 by the new companies which are now substantial producers (see table).

VENEZUELA — Average Daily Crude Production By Companies, 1958

Company	
Creole	1,071,104
Shell	703,697
Meneg	388,941
Socony	127,619
Mercedes	34,068
Texas	50,900
Richmond	75,217
Atlantic	27,941
Sinclair	61,533
Phillips	11,613
Talon	1,583
Caracas	27
Coro	62
Superior	26,327
Venez. Sun	12,103
San Jacinto	8,681
Signal	3,275
Pan Venez.	84
Continental	65
Total	2,604,840

Natural Gas: Increasing attention is being paid to natural gas in Venezuela. Its utilization has increased rapidly, from 29.7% in 1956 to 35.6% in 1957, with further increases in 1958. Among the projects are gas-injection plants, as later discussed, and LPG (liquefied petroleum gas) plants which placed Venezuela in the ranks of LPG exporters for the first time during 1958, when Creole began exports to the USA and Europe from a plant in western Venezuela. Mene Grande also has a new $6.5 million plant for LPG production, and began exports in November.

In 1957, natural-gas production rose to a daily average of 3,108 mmcf per day, a 16.2% increase compared with 1956. The boost was attributed entirely to increased crude-oil production. The gas was disposed of as follows: 7.8% burned as fuel; 3.5% sold; 23.0% returned to oil reservoirs for pressure maintenance; 1.3% recovered as liquids in natural-gasoline plants; 64.4% vented to the atmosphere.

Construction of Creole Petroleum Corp.'s fourth big gas-injection plant in Lake Maracaibo, 4½ miles offshore from Tia Juana, began at Bachaquero in September, and will be completed in 1½ years.

Mene Grande has built a gas plant at Limon field to inject about 15 mmcf daily; and plants with smaller capacities were completed at Oscurote Norte, Mata Grande, Mata, and Mapiri fields. At the end of 1957, 30 gas-injection plants were operating in Venezuela, with a combined effective injection rate of 705 mmcf daily, ac-

(Continued)

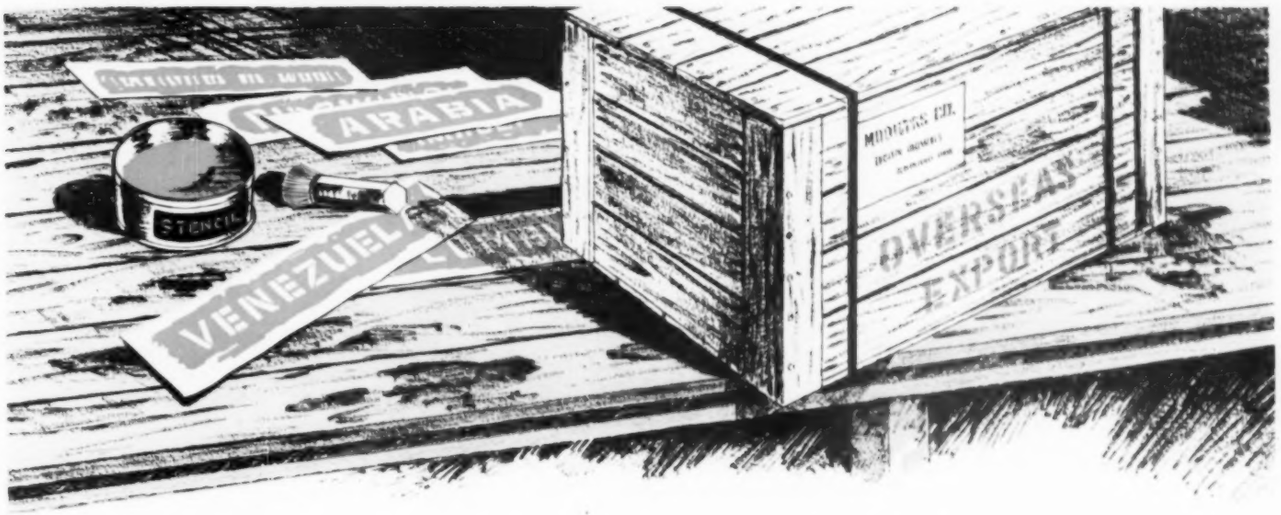
VENEZUELA — Crude-Oil Production, 1958
(Barrels Per Day)

January	2,492,019	July	2,581,039
February	2,575,090	August	2,646,729
March	2,492,118	September	2,583,137
April	2,507,684	October	2,689,721
May	2,478,179	November	2,816,245
June	2,545,849	December	2,848,476

Year (1958) 2,604,840 b/d

VENEZUELA — Crude Production Since Inception
(Annual Average in Barrels Per Day)

Year	Venezuelan Crude Production	% of World Production
1918	917	0.1
1919	830	0.1
1920	1.254	0.1
1921	3.980	0.2
1922	6.224	0.3
1923	11.495	0.4
1924	25.183	0.9
1925	55.405	2.0
1926	100.022	3.4
1927	171.691	5.0
1928	286.546	7.9
1929	374.924	9.2
1930	375.443	9.7
1931	319.762	8.5
1932	318.357	8.9
1933	232.981	8.2
1934	373.707	8.9
1935	407.075	9.0
1936	422.691	8.6
1937	509.087	9.1
1938	515.583	9.5
1939	562.834	9.9
1940	508.520	8.7
1941	624.979	10.3
1942	405.340	7.1
1943	491.575	8.0
1944	702.289	10.3
1945	885.917	12.5
1946	1 064.683	14.1
1947	1.191.037	14.4
1948	1.338.831	14.3
1949	1.321.295	14.2
1950	1.497.890	14.4
1951	1.704.621	14.5
1952	1.804.702	14.7
1953	1.765.864	13.7
1954	1.896.283	13.9
1955	2.157.861	14.2
1956	2.457.933	14.8
1957	2.779.245	15.7
1958	2.604.840	14.4



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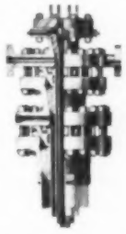

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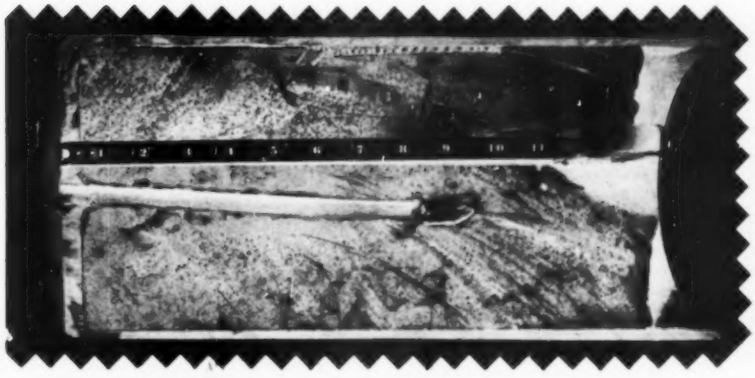

Unretouched photo (lower left) shows the remarkable bullet penetration of over 9" from a 4" O.D. Atlas BULLDOG gun, typical of several test shots *fired under 2500 p.s.i. hydrostatic pressure at 180°F.* Tests with 5-7/16" O.D. Atlas BULLDOG guns produced much deeper bullet penetrations.

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cording to the government. In addition, 11 water-injection plants were serving pressure-maintenance and secondary-recovery projects.

TRANSPORTATION: The oil industry completed facilities for transport of an additional 1.5 million barrels daily in 1958. They include Mene Grande's 30-in. loop from Oficina to Pto. La Cruz, and many other projects.

Creole completed a 90-mile 30-in. line in eastern Venezuela for viscous Temblador-area crudes. The new line has a capacity of 300,000 to 500,000 b/d depending on the viscosity of the crudes moved.

Cia. Shell de Venezuela is building an extensive new pipeline system along the east shore of the lake, and a large terminal for shipment of crude at Puerto Miranda. The trunk crude-collecting system is a 30-in. heated line starting at Bachaquero field, passing through Lagunillas and Cabimas. There will be two trunk lines leading from Cabimas to Puerto Miranda of 34- and 30-in. diameters, respectively. The design capacity of the Bachaquero-Cabimas line is 400,000 b/d, and from Cabimas to Puerto Miranda 800,000 b/d.

Gas Pipelines: Petrogas SA is building a 200-mile 26-in. line to move natural gas from the Anaco-area oil fields in eastern Venezuela to Caracas.

Creole is building an under-water gathering system for natural gas in Lake Maracaibo, to include 18 separate lines, comprising two miles of 16-in., 8½ miles of 30-in., and 11 miles of 40-in. pipe.

A new $5,500,000 deep-water pier, which will serve two 54,000-ton tankers at one time, is being built at the 195,000 b/d Cardon refinery by Cia. Shell de Venezuela. The new pier, Cardon's fourth, will be 1,384 ft long.

Tankers: A group of Caracas financiers is organizing a tanker fleet. Flota Petrolera Venezolana CA (Flovenca), headed by real-estate executive Guillermo Veloz Mancera, plans to raise $15 million through public stock sale to build or buy the ships. A French-Swiss group has agreed to finance 80% of the cost of the new tanker construction. The government is already operating a merchant fleet. Venezuelan-flag vessels are at a competitive disadvantage. Cost of operating ships under Venezuelan registry is roughly equivalent to that of USA vessels, because of high wage scales and repair costs.

REFINING: 1958 was a record refinery construction year in Venezuela; and 1959 is to be even greater. Three refiners—Creole, Shell, and Richmond—added substantially to their capacities during the year. Added to these was the first new refinery built in Venezuela for many years, the new Socony Mobil de Venezuela plant at Puerto Cabello, begun early in 1958. In addition, two new lube plants—one completed in May by Creole, and one at the new Socony plant—went onstream during the year.

The Amuay Bay refinery of Creole Petroleum Corp. increased its crude refining capacity by 104,000 b/d by installation of a fourth atmospheric pipe still, bringing total design crude distillation capacity to 328,000 b/d; and this, added to the 60,000 b/d capacity of the Caripito refinery, brought Creole's total crude refining capacity close to 400,000 b/d.

A 17,000 b/d diesel-oil hydrofiner, begun in January 1958, can desulfurize Tia Juana medium diesel oil down to 1.0% from 2.0% by weight of sulfur.

At Punta Cardon, Shell is adding an 80,000 b/d atmospheric distillation unit which will bring the refinery's capacity to 283,000 b/d.

The Bajo Grande refinery of Richmond Exploration Co. was expanded sharply. No. 2 unit was increased to 15,000 b/d by the installation of additional heat exchangers and feed pumps; also additions were made to unit No. 3 so that it will be approximately 23,000 b/d, and solid asphalts capacity will be about 8,500 b/d.

The Venezuelan government, on its huge, still unfinished petrochemical complex at Moron, already has spent $134 million. $27 million is yet to be paid on existing contracts; and another $30 million has been budgeted by Petroquimica.

Thus far Venezuela has a 3,000 b/d pilot-plant refinery; a German-built chloric-acid plant with an annual output of 10,000 tons of chlorine and 11,200 tons of caustic soda; and a series of Italian-built synthetic fertilizer plants. Original plans called for an annual output of 150,000 to 200,000 tons of nitric acid, ammonium nitrates, ammonium sulfates, urea, and superphosphates (actual current output of these units was not disclosed); plus a 43-mile 12-in. natural-gas pipeline to move gas from Guacara to Moron.

VENEZUELA — Distribution and Productivity Data on Oil Wells
(As of June 30, 1958)

Field	Producing	Non-Producing	To Be Abandoned	Abandoned	Total
Cabimas	760	378	156	401	1,695
Tia Juana	915	757	6	65	1,743
Lagunillas	1 778	941	30	269	3,018
Bachaquero	935	1,157	27	326	2,445
Mara	53	59	7	14	133
Boscan	295	54	2	14	365
Other fields	1	34	15	334	384
Urdaneta	4	8	—	18	30
Cumarebo	22	52	3	77	154
Motatan	—	5	—	6	11
La Concepcion	78	67	66	8	219
Sibucara	5	2	3	2	12
La Paz	43	100	32	11	168
Mojan	3	—	1	—	4
Mene Grande	483	166	75	43	767
Ceuta	5	3	—	—	8
Tiguaje	18	8	—	18	44
Mene Maurosa	57	21	171	166	415
Hombre Pintado	46	9	18	7	80
Ensenada	1	—	—	5	6
Cruces Manueles	130	57	31	44	262
West Tarra	32	16	3	3	54
Rio de Oro Mamon Area Expl. Lago	—	14	1	13	23
Total Maracaibo	5,664	3,908	647	1,844	12,063
Barinas	49	20	—	37	106
Mulata	105	82	9	45	246
Santa Barbara	201	145	3	62	411
Aguasay	17	2	—	2	21
Temblador	72	23	—	28	123
Tucupita	40	3	—	13	56
Oritupano	33	16	—	21	70
Quiriquire	488	60	6	77	631
Jusepin	138	222	16	73	449
Exploratory, Muri Travieso, Mene Grande and Tacat	128	220	—	263	611
Total Maturin	1,222	778	34	584	2,618
Oficina	351	200	45	76	672
Guara	232	85	14	45	376
Nipa	281	110	12	14	417
Leona	63	65	16	27	171
Chimire	113	89	3	16	221
Dacion	93	22	—	7	122
Soto	117	73	9	15	214
Merey	54	110	2	12	178
Boca	19	45	—	6	70
El Roble	20	28	—	—	48
Socorro	—	2	—	4	6
Pelayo	3	3	—	7	13
Exploratory, Fria, San Joaquin, Santa Rosa, Santa Ana, Quimare, Yopales, Tapuco, Guico, Guario, Oscurote, Mata, San Roque, Las Mercedes, Paliacio & Other fields	1,216	838	17	818	2,889
Total Barcelona	2,562	1,670	118	1,047	5,397

OIL LAWS*

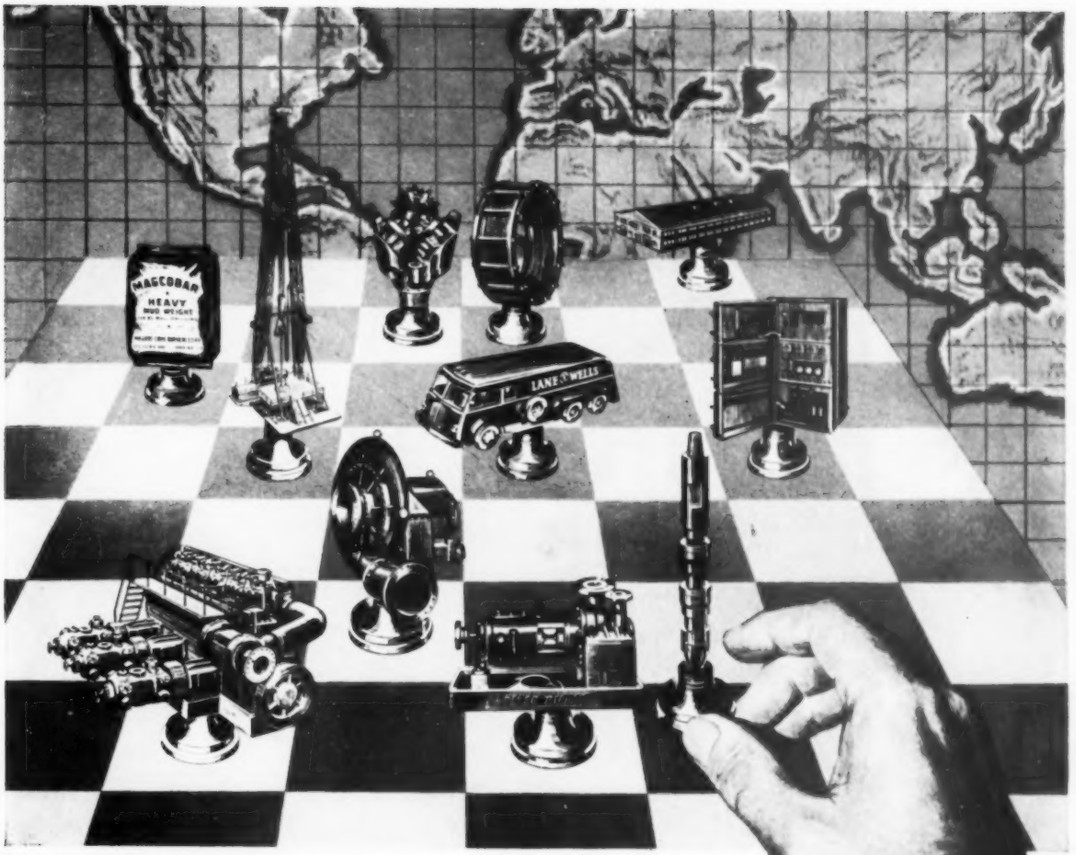
Controlling Statutes*: Basic controlling statute is the Hydrocarbons Law of 1943. It is summarized in *World Petroleum Report—1957*, where a complete discussion is contained. No changes have occurred in this law, with the exception of some very minor amendments in 1955. The outstanding and unexpected changes late in 1958 as regards the income tax are not involved in the oil law, and are discussed under National Factors, in this article.

Significant changes during 1958 in the income-tax law amount almost to a complete revision. The law has been translated, both in its 1955 version and the new 1958 law; it is kept on file at the New York offices of *World Petroleum Legislation Report*.

During early 1959, the government made extensive changes in the regulations to the 1943 oil law which are so extensive that, in effect,

*Translations of the complete text of all oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).

(Continued on page 156)



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Petroleum, priceless ingredient of energy as well as boundless by-products, plays a universal game of hide and seek with the world's oil men. Wherever the ground justifies the gamble, Dresser representatives are on hand to provide specialized equipment and technical services that encourage success. These men of Dresser are identified by many corporate names... for Dresser Industries, Inc. is a group of specialized companies each of which operates independently to better serve your needs. Though representing any one of eleven operating units, Dresser men are prepared to put at your service the famed Dresser *plus* ✚. This *extra* value results from the coordinated performance of all Dresser companies—combining global experience, engineering talent and diversified manufacturing facilities in many countries. Throughout the oil, gas, chemical and other industries the Dresser *plus* ✚ is your assurance of superior equipment and technical services—the standard of comparison the world over.

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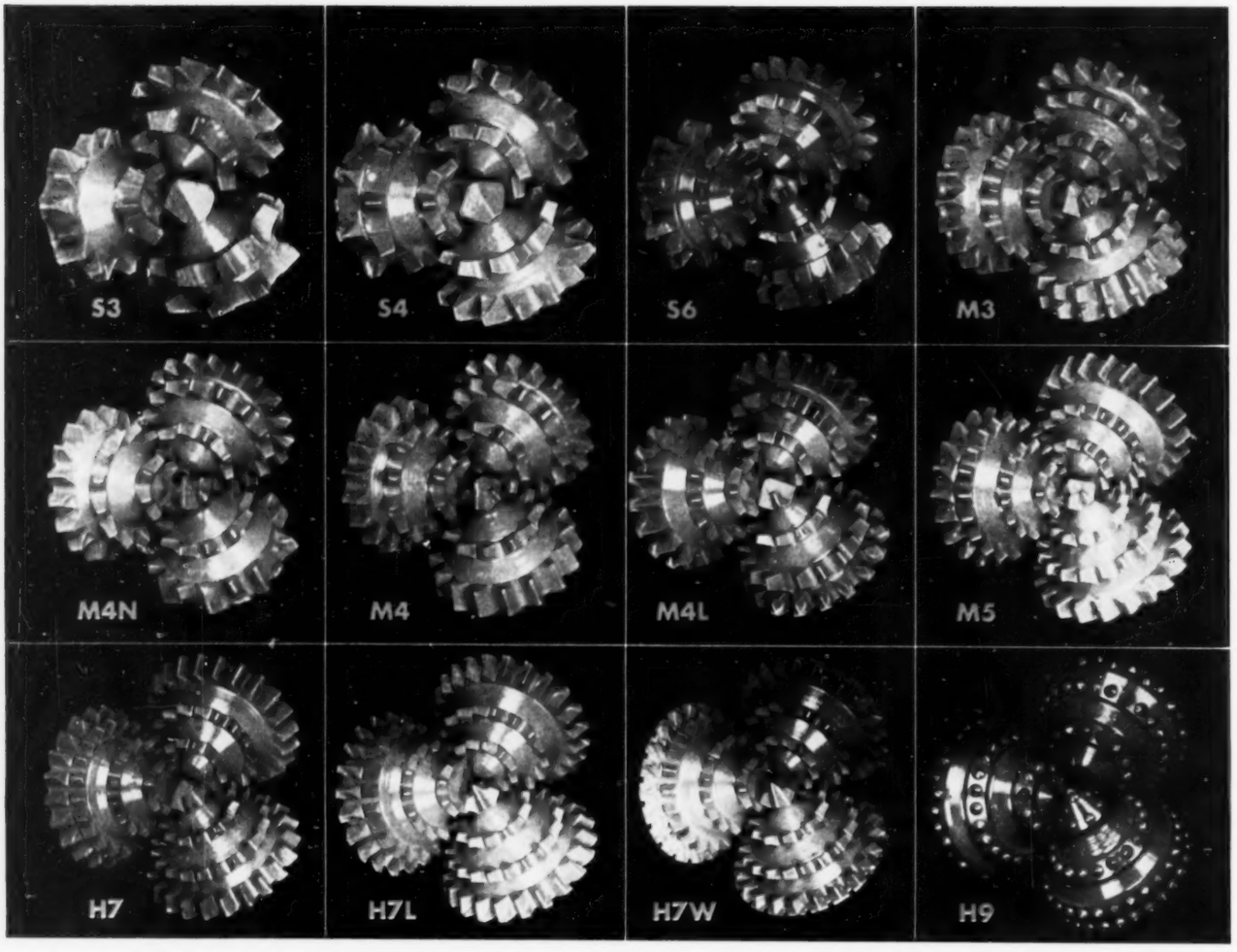

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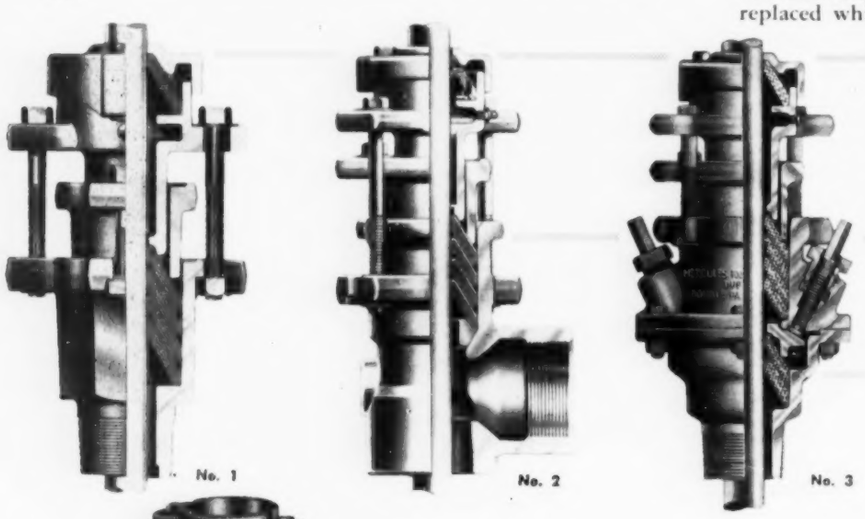
PUT MORE OIL IN YOUR TANKS *and improve the SAFETY, ECONOMY and EASE of Oil Production throughout the World.*

Hercules oil field production equipment was first used in Kansas and Oklahoma oil fields. From this area, because of its consistent quality, flexibility and rugged construction, its use spread first over all of the fields in the United States and Canada. Now its popularity has spread around the globe and you will find Hercules products available through supply houses everywhere.

Hercules Duplex Polished Rod Stuffing Boxes are available in three styles:

1. "Regular Type" — Has male thread to screw into Pumping Tee.
2. "Tee- Type" — A combination Tee and Stuffing Box. Has female thread to screw directly onto tubing.
3. "Type DP" — Double Packed for use on high pressure or intermittently flowing wells. Allows Main Packing to be replaced while pressure is on well.



HERCULES "REGULAR TYPE" DUPLEX STUFFING BOX

More efficient operation with fine adjustment possible. Offers longer packing life due to ability of Packing and Glands to follow lateral movement of Polished Rod. Malleable iron construction prevents breakage if rods are accidentally dropped on Stuffing Box.

HERCULES "TEE TYPE" Duplex Stuffing Box

Very compact as it is approximately only 15" high. Eliminates one threaded connection between Stuffing Box and Tee. Full opening — allows Rods to be run or pulled without removing Stuffing Box body.

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Designed for use on high pressure or intermittently flowing wells. Allows Main Packing to be easily changed by turning the two compression bolts until lower Packing packs-off. The Upper Packing can then be removed and replaced.

HERCULES OIL RESERVOIR UPPER GLAND

Any Hercules Stuffing Boxes may be equipped with Oil Reservoir Upper Gland on "problem" wells which pump-off and burn packing. The polished rod moves through the oil in the reservoir which lubricates and cools it.

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For use with all Hercules Stuffing Boxes (except "DP TYPE" Box). Manufactured from Hi-Tensile aluminum alloy, weighing only 20 pounds. These supports offer maximum safety with minimum weight. Easily handled and installed by one man. Prevent accidents and personal injuries, while clamping-off, by using Hercules Clamp-Off Supports.

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Hercules Split Cone packing rings come in three grades: SOFT rings are used always with bronze liners or with steel polished rods in wells which are not always pumping fluid. HARD Rings are used and recommended for steel polished rods only, and where fluid is constantly being pumped. LUBRICATED Rings are recommended for problem wells which pump-off persistently. When well is pumped dry, the rings lubricate the polished rod and prevent the packing from burning until fluid is again present.

HERCULES SPLIT CONE PACKING RINGS are packed in sets of four in each of three grades: SOFT, HARD and LUBRICATED.

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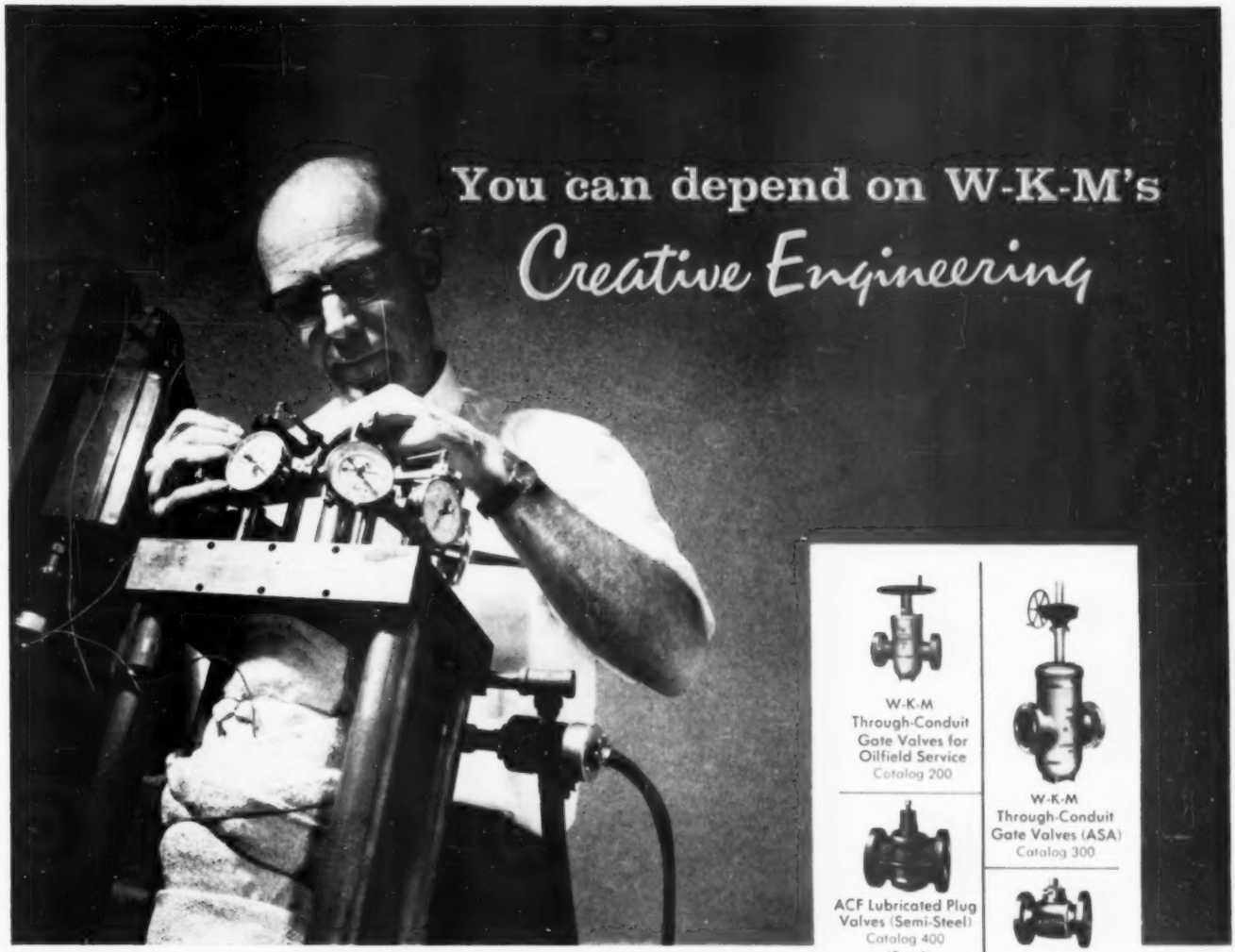

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they change the basic law itself. They include more stringent regulation of gas use, prorationing by determining production per well, increased conservation regulation, and well-drilling restrictions. Final action on them had not been taken as of January 31, 1959.

NATIONAL FACTORS

The principal factor in Venezuela's attractive investment climate has been the government's liberal attitude and trained personnel directing the government's regulation of the oil industry. These and other factors are discussed in *World Petroleum Report—1958*, and are not repeated here. During 1958, elections were held following the ouster of Jiménez. The victor was Romulo Betancourt, leader of the Democratic Action party and new president of Venezuela. His attitude toward the oil industry has been one of studied criticism; he is the author of a long study of the industry, written during his exile in Mexico, and has expressed his views (*World Petroleum*, July 1, 1958) toward revision of the present oil regulation.

The outgoing gesture of the military junta governing the country, however, just before Betancourt's installation as president in December 1958, was to increase the income tax. From a former maximum of 26%, it jumped to a retroactive (through 1958) maximum of 45%[1], as covered in the accompanying tables. The reaction of the oil companies was one of indignation and surprise; the junta had promised not to pass legislation basically affecting the oil industry until the new elected regime had been installed. It altered the famous "50-50" concept which has its origins in Venezuela. This was the first time any producing country had done so as regards established producers.

The increase in the income tax may be offset in part by a readjustment in the valuation of crude for royalty purposes. While the valuation did not make much difference under the 50-50 concept, it now assumes more importance, and the companies are pressing for a more realistic value on production and on the government's royalty share.

Oil's Importance to Venezuela: The relative place of the petroleum industry in Venezuela's general economic life is shown by the following: During 1957, 91.82% of the energy supply of Venezuela was supplied by petroleum. During 1956, 78.05% of government revenues were supplied by petroleum operations. END

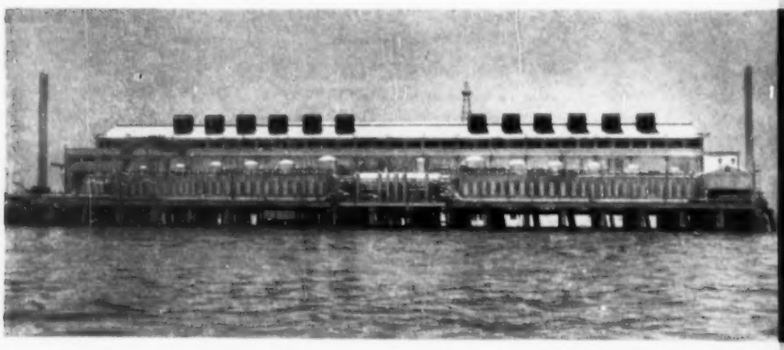
[1]The income-tax law has been translated and is kept on file at the New York Offices of *World Petroleum Report*.

VENEZUELA—Operating Refineries
(As of July 1, 1958)

Plant	Location	Crude Type Capacity Plant	Cracking Capacity
Creole Petroleum Corp.	Amuay Bay[1]	328,000 S	—
	Caripito	60,000 SC	35,000 T
Phillips Oil Co.	San Roque[3]	3,000 S	—
Richmond Exploration Co.	Bajo Grande[4]	45,000 SA	—
Cia. Shell de Venezuela Ltd.	San Lorenzo	45,000 S	—
	Cardon[2]	203,000 SCL	63,000 TC
Shell Colon Development Co. Ltd.	Casigua	1,000 S	—
	La Rivera	300 S	—
	El Calvario	300 S	—
	El Cubo	570 S	—
Sinclair Oil & Refining Co.	Puerto La Cruz	35,000 S	—
Socony Mobil de Venezuela	Silvestre	200 S	—
	El Palito[7]		
Texas Petroleum Co.	Tucupita	10,000 S	—
Venezuelan Government	Maron[6]	3,000 Comp.	1,800 T
Venezuela Gulf Refining Co.	Puerto La Cruz[5]	57,000 Comp.	18,660 TC
		791,370	118,460

[1] 11,000 b/d Hydroforming capacity; 700 b/d lube plant onstream May 1958; 17,000 b/d Hydrofiner onstream January 1958.
[2] Includes new 35,000 b/d catalytic cracking recently added. 25,000 thermal cracking capacity, 2,800 b/d alkylation plant. 80,000 b/d distillation unit under construction, completed 1958.
[3] Includes 14,500 b/d vis-breaker unit. Also has polyform unit. Fluid catalytic cracking unit is 8,660 b/d capacity; thermal cracking unit 10,000 b/d.
[4] Consists of three distillation units: Unit 1 has 15,000 b/d capacity; unit 2 has 10,000 b/d capacity; unit 3 has 20,000 b/d capacity. Unit 2 to be expanded to 15,000 b/d by addition of heat exchangers and feed pumps. No. 3 to be raised to 23,000 b/d for production of topped crude and heavy fuel oils and 8,500 b/d asphalt. All additions to be completed during 1959.
[5] Consists of two separate plants at same location: including one 500 metric tons per month lube plant; one 3,000 b/d refinery which makes about 1,200 b/d of motor gasoline, also kerosine and diesel fuel. Gas-stabilization unit is connected.
[6] A pilot plant with complete facilities for experimentation. A larger refinery and a petrochemical complex have been under construction, but plans are presently being restudied.
[7] 40,000 b/d plant constructed at El Palito terminus, about 8 miles from Puerto Cabello, with lube plant and facilities for production of high-octane gasoline included.
Capacities in barrels per day. Key to type of plant: S - Skimming; L - Lubricating; A - Asphalt; C - Cracking; Comp. - Complete. Under cracking capacity to indicate type: T - Thermal; C - Catalytic.

■ The big gas repressuring plant in Lake Maracaibo's Tia Juana field, one of three, is solid evidence of the major organization Brown & Root maintains on a permanent basis in Venezuela.



An imposing array of heavy equipment, both land and marine, plus a major fabrication and maintenance yard on the lake shore, provides the Venezuelan oil industry with the standard of performance that is the hallmark of Brown & Root around the world.

LANDMARK in the water

Brown & Root Builds for Better Methods, Bigger Production in Lake Maracaibo

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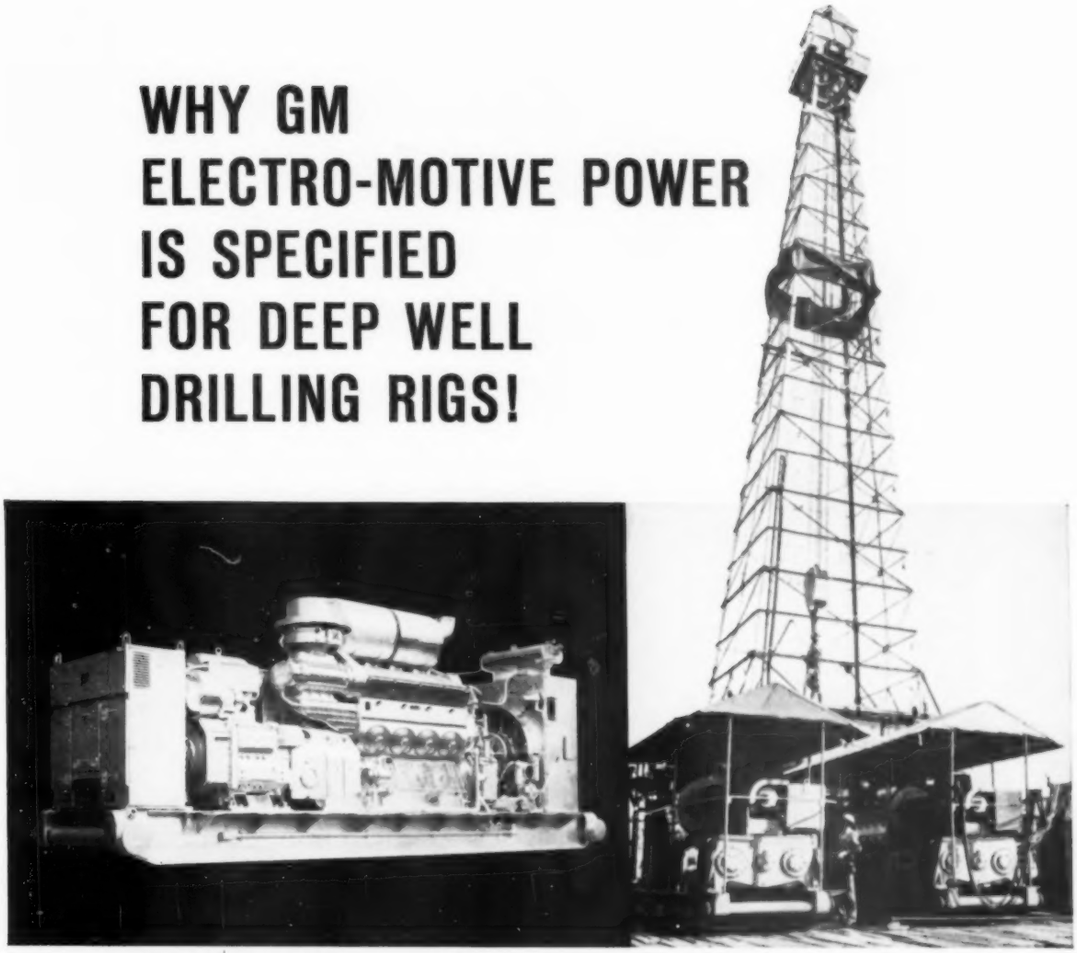
WHY GM ELECTRO-MOTIVE POWER IS SPECIFIED FOR DEEP WELL DRILLING RIGS!



Model SR-10-A 1000 Horsepower Unit

MAKES HOLE FASTER—GM Electro-Motive Diesel-Electric Power reduces drilling time—and *costs!*

FLEXIBLE—Electric cables between generating units and drive motors are flexible, permitting fast transport, quick rig-up and complete freedom of power arrangement.

SIMPLE, ACCURATE CONTROL SYSTEM—Provides smooth and rapid acceleration of loads with positive control of speed and torque.

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No wonder GM Electro-Motive Power is specified for more and more deep well rigs!

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GM GENERAL MOTORS DIESEL POWER

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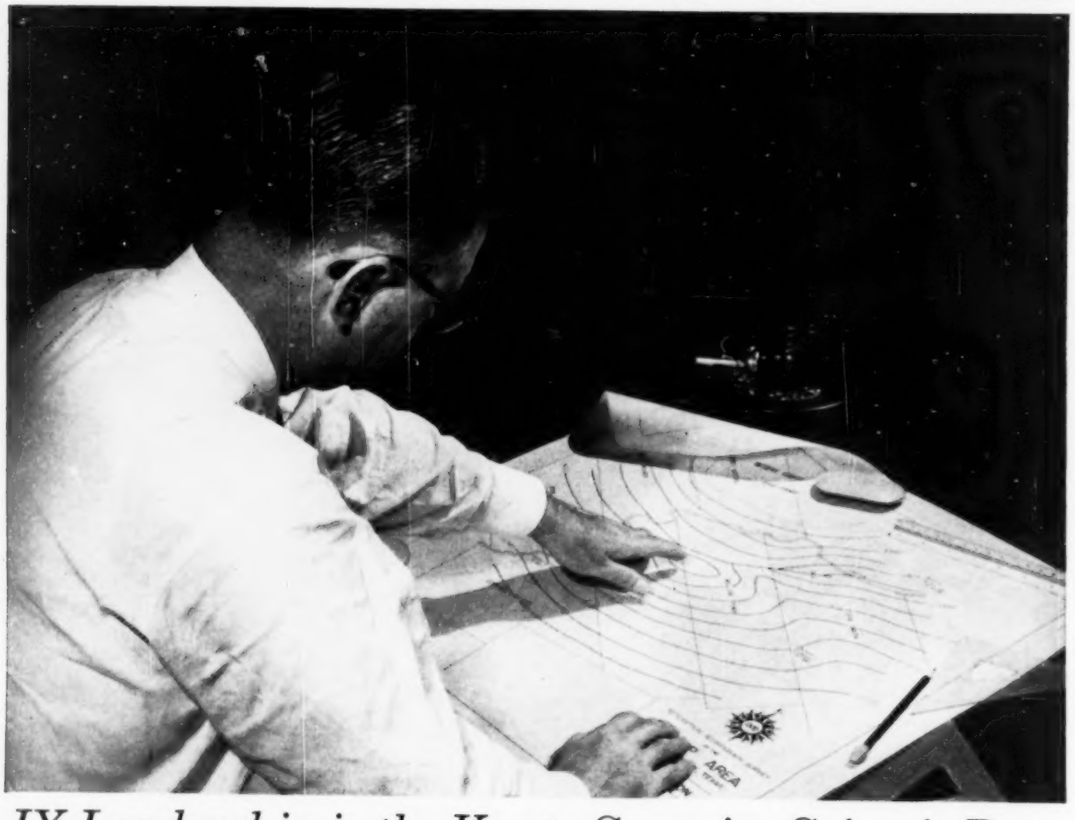
GENERAL MOTORS LOCOMOTIVES

POINTING THE WAY FOR THE DRILL



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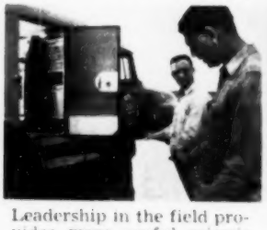
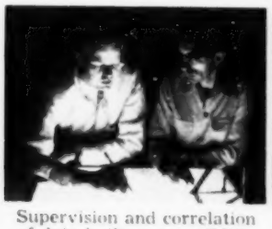


Leadership in the field provides **more** useful seismic records. IX party chiefs average 17 years experience, and observers 15 years.



Supervision and correlation of data is the responsibility of company executives averaging 23 years experience at Independent Exploration Co.

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The 66 **moves** fast . . . because it is compact, lightweight, fully unitized. Draw works, drive and two or three engines are mounted on a single skid base to reduce tear-down, moving and rig-up operations.

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Fiberglass case (on all units) has integrally-molded steel brackets which provide a means of attaching straps for portable use.

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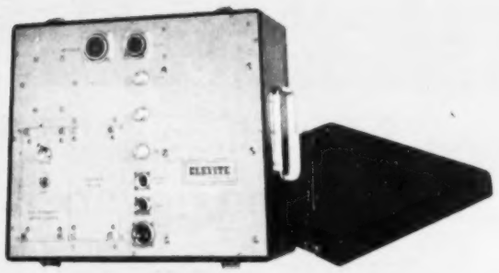
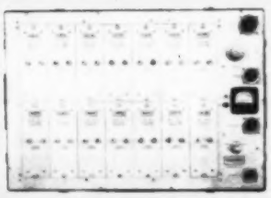
MFR-1 MAGNETIC FIELD RECORDER
28-channel, individually sprung FM or AM heads. Complete head bank is mounted on precision ways and removable without tools. Single channel may be replaced and phased in the field.

Unique belt drive system of stainless steel is servo-controlled and locked to precision fork frequency standard.

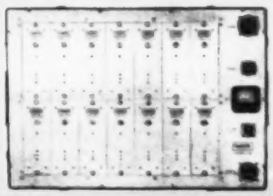


TFP-1 MOTOR DRIVE SYSTEM AND POWER UNIT (Transistorized)
Power unit contains 400 cps time standard, phase comparator, motor drive oscillator, motor drive amplifier, and auxiliary power supply.

MFM-1 MAGNETIC FIELD MONITOR
Four-inch electric writing paper with preprinted timing lines. Rectilinear electric or ink stylus.



MM-4 MAGNETIC MODULATORS
14 dual channels plus control and metering panel.



DM-2 FREQUENCY DEMODULATORS
14 channels per bank.

NORTH AMERICA

PHYSICAL DEVELOPMENT

EXPLORATION: Exploration in North America far overshadows the entire remainder of the world's oil industry, even though during 1958 it declined substantially due to a drop in oil demand. The number of exploratory discoveries made was large, as covered in the following sections on Canada, the United States, and Alaska; but the era of extremely large discoveries appears to be vanishing, and all the finds in 1958 were of medium or smaller size.

1959 exploratory drilling is estimated to pick up to about 1957 levels—a good increase over 1958, but not impressive in total. Most of this will be in the United States which, it is estimated, will lift its total of wells drilled to almost 53,000 in 1959.

PRODUCTION: During 1958, production rose over 1957, as shown in accompanying tables. 1959 production is estimated at 7,158,425 b/d. Alaska entered the ranks of crude producers for the first time in decades (there was some small production there in the early '30's).

REFINING: Refining capacity grew during 1958, to 9,978,120 b/d.

MARKETING: Consumption in the USA and Canada (including Alaska) rose during 1958. Imports grew substantially, with the United States and Canada both large importers of crude oil. Imposition of controls over USA imports of crude oil will reduce the 1959 total substantially. (see United States section).

OIL LAWS

Controlling Statutes: The governing oil regulations for the United States, Canada, and Alaska are covered in *World Petroleum Report —1958*. Copies of these laws are kept on file at the New York offices of *World Petroleum Report*, where they may be consulted freely.

No basic changes occurred in oil regulation during 1958. In Alaska, the transition to statehood within the United States resulted in a good part of that area becoming subject to USA federal regulation, identical with that of the United States. In Canada, new oil regulations were promulgated for the Northwest Territories.

NATIONAL FACTORS

During 1958, the United States tended to isolate itself from international oil trade by imposition of barriers against imports of crude oil. The barriers have not as yet been extended to products, however. During 1959, it is probable these barriers will be made permanent.

The growing insularity of the important USA market has likewise had its effects on the international price structure. For many years oil's price around the world has been based on the USA price, but recently prices in the Middle East began to move independently of those in the United States.

The oil industry is the object of unceasing attack from various sources, especially in the United States. It is the largest single international investment by that country, however, and still benefits from considerable tax encouragement.

END

UNITED STATES

Burdened with excessive inventories and declining total demand, the petroleum industry in the United States reduced the tempo of its activities in 1958. Every division of the industry was affected.

In 1957, the first year of the recession, the industry had enjoyed a 31% increase in exports as a result of the Suez crisis, with the result that the total demand was 1.8% higher than in 1958 even though there was no appreciable expansion in domestic consumption. The industry was slow in realizing the extent of the depression and its impact on sales, with the result that in 1957 aboveground stocks of crude and products rose 60,926,000 bbl, an average of 167,000 b/d.

In 1958 the industry undertook the disagreeable task of liquidating the excess storage accumulated in 1957, and doing so at a time when exports were being cut in half and domestic consumption was only beginning to rise. Stocks of finished products were drawn down at the rate of 41,000 b/d and crude storage at the rate of 86,000 b/d.

Net result of the correction was a reduction in crude production of 6.5%, in natural-gas liquids of 1%, and in refinery runs to stills of 4.1%.

These cuts were made at a time when domestic demand was rising 2% over 1957 so, with a drop of 51.8% in exports, there was a net reduction in total demand of 1.2%.

Resisting the cutback in crude lifting, the producing branch of the industry continued its pressure on the government to insulate domestic markets against imports of foreign oil. Importers were faced with more stringent crude quotas under the so-called "voluntary" import schedules.

Because foreign crude was cheaper than domestic, nobody was happy with the assigned quotas. Old established importers suffered severe cuts to take care of new importers, and neither felt they were getting as much low-cost raw material as they were entitled to. Without such restrictive quotas, refined oil imports increased 30.5% in 1958 while crude imports were being cut 9.8%. Net imports of crude and products combined constituted 15.5% of domestic consumption in 1958, compared with 11.6% in 1957 and 11.4% in 1956. Table I shows USA supply and demand data for 1958 compared with earlier years. The figures for 1958 are preliminary estimates by the American Petroleum Institute.

MARKETS: Crude and refined-oil markets were soft most of the year as a result of excess supply. Some recovery took place late in the year as a result of the general upturn in business.

At mid-year there was little unanimity among buyers as to the value of 36-gravity Oklahoma crude. Some still held to the $3.07 posting, while others were offering $2.83. By the end of the year the average price was calculated at about $3.00. In California, Signal Hill 21-gravity oil dropped 57¢ during the year, to $2.50 from $2.93.

The landed cost of Middle East crude at seaboard terminals was consistently below domestic markets. Eastern Hemisphere crude drove Canadian oil out of refineries in the Pacific Northwest.

Both gasoline and fuel-oil prices were depressed at the Gulf. Bunker "C" fell to $2.00 from $2.55 during the year. The cargo market for 98-ON gasoline ranged from 12.75¢ to 14¢ early in the year, but by mid-December was down to 11.75¢ to 12.75¢ per gallon.

The New York harbor barge market for bunker "C" fell to $2.37-$2.45 from $2.95 by December. No. 2 fuel was depressed during the summer, but was back up above 10¢ in December. The average retail price of gasoline at the service station before tax dropped 0.54¢ in the first 11 months to 21.57¢. The average was also below 1956 and about equal to 1954.

EXPLORATION: Geophysical activity was low during early months of the year, continuing a trend established in 1957. Seismic parties in the field reached a low of 431 at the end of March, but by September had jumped an astonishing 40% to 60%, the highest level in recent years. At the end of 1955 there were 550 seismic parties in the field; a year later, 492; and on December 31, 1957, only 466. There was an increase also in gravity-meter and magnetic work and core drilling, bringing September exploratory work to 707 operations compared with 560 at the end of 1957.

The number of rotary rigs operating in the USA followed a similar pattern. Dropping from 2,500 at the end of December 1957, only 1,800 were running in March. This level was steady until July, after which a steady climb brought operations to 2,300 in November.

Total completions for the year are estimated at 47,500, compared with 54,000 in 1957 and 58,200 in 1956. Of the 1958 completions, 10,450 were exploratory wells, a drop of 1,300 from 1957.

Offshore work in the Gulf of Mexico lagged in 1958, but important new tests were begun offshore from California. Greatest exploratory activity was in various basins in the Rocky Mountain area. Discovery of a productive reef in Utah's Paradox basin created excitement at the end of the year.

Undismayed by the 1958 lag in drilling, economists are unanimous in projecting a tremendous increase in drilling within the next few years. Chase Manhattan Bank issued a booklet in December suggesting that the industry must drill three billion feet of hole in 670,000 locations within the next 10 years. By 1967, the annual activity should reach 75,000 wells and 350 million feet of hole. (*Continued*)

UNITED STATES *(continued)*

Cost of drilling a foot of hole continues to rise, with the result that the domestic industry's capital expenditures for production totaling $4,525 million in 1958 were about the same as in 1957 despite the fewer number of wells drilled. Barrels of oil discovered per foot of well drilled continued to fall as has been the case since World War II.

CRUDE PRODUCTION: USA output of crude petroleum and lease condensate dropped 6.5% in 1958 to 6,707,000 b/d. At the end of the year there were about 485,000 active producing wells with an average output of about 11.3 b/d. This compares with a per-well yield of 12.8 b/d in 1957 and 13.3 b/d in 1956.

UNITED STATES—Crude-Oil Production, 1958
(Barrels Per Day)

January	6,865,000	July	6,571,000
February	6,809,000	August	6,939,000
March	6,273,000	September	7,099,000
April	6,288,000	October	6,978,000
May	6,233,000	November	6,984,000
June	6,341,000	December	7,105,000e

Year (1958) 6,707,000 b/d

e Estimated.

Except in the Rocky Mountains, the reduction in crude production was general and relatively uniform. In District IV there was an increase in output of 10.5% in the first nine months of the year.

Details by PAW districts follow:

JANUARY—SEPTEMBER CRUDE PRODUCTION
(Thousands of Barrels)

	1958	1957
Dist. I	8,526	10,265
Dist. II	358,734	367,881
Dist. III	1,040,408	1,209,088
Dist. IV	158,170	143,859
Dist. V	235,967	254,302
Total USA	1,801,805	1,985,395

Productive Capacity: Confirming previous studies by the National Petroleum Council and others, the Independent Petroleum Assn. of America has estimated that the productive capacity of the USA industry on January 1, 1958, was 10,373,000 b/d of liquid petroleum. This was divided into 9,493,000 b/d of crude oil and 880,000 b/d of natural-gas liquids. On the basis of this estimate, crude producers were operating at 71% of capacity during the year. The natural-gas liquids segment of the industry was producing at about 91% of potential.

Improvement in producibility of wells through new techniques has made it possible to lift a much greater proportion of known reserves per year than ever before in the history of the industry. With known reserves of 30.3 billion barrels and a productive capacity of 3.35 billion barrels per year, it is estimated by the IPAA committee that our known reserves could be lifted in 8.9 years. Total oil demand was at the rate of 10% of reserves in 1958.

Many leaders in the industry now are worried by high producing capacity and low known reserves. A movement got under way during the year to promote wider spacing of development wells. This would have the dual effect of reducing costs and releasing capital funds for the drilling of exploratory wells to seek new reserves.

A cost study committee of the IPAA confirmed the disturbing lack of new discoveries when it found that in 1957 nearly three-fourths of the oil produced came from fields discovered prior to 1950. The study showed that 61% of the fields in the country have been discovered since 1950, but only 27% of the crude was produced from these fields. In recent years, fields have been smaller so that the industry actually is living on older discoveries which cannot be replaced at present costs.

Reserves: Proved reserves of crude oil decreased 134 million barrels in 1957 to 30.3 billion barrels. New discoveries during the year totaled 416 million barrels, and two billion barrels were added through extensions or reappraisals of the reserves in older fields.

Reserves of natural-gas liquids also decreased 215 million barrels to 5,687 million barrels.

Following is a summary of the trend in liquid reserves in recent years as estimated by the American Petroleum Institute:

Year	Crude	Natural-Gas Liquids	Total Liquids
	(Millions of Barrels)		
1957	30,300	5,687	35,987
1956	30,435	5,902	36,337
1955	30,012	5,439	35,451
1954	29,561	5,244	34,805
1953	28,945	5,437	34,382

While 1958 estimates place USA reserves of oil at around 33.5 billion barrels, this could be raised by 184 billion barrels if higher prices and more economical recovery methods develop. To be added to this are some 45 billion barrels of shale oil recoverable by present methods at present prices. Higher prices could increase this overall total by 855 billion barrels.

Assuming that total imports of crude and products into the United States in 1959 are about the same as in 1958, it is anticipated domestic crude requirements will rise about 6.8% and return to about the 1957 level. Total demand for oil is expected to rise about 4% to 9,640,000 b/d. Some estimates at the beginning of the year were as high as 9,677,000 b/d. Natural-gas-liquid production may rise 5.2% in 1959 to 840,000 b/d as gas distribution continues its rapid expansion.

Looking forward several years in advance, economists at Chase Manhattan Bank believe the USA should be able to produce about 9,500,000 b/d of crude and 1,300,000 b/d of natural-gas liquids by 1967. In that year, they believe the energy requirements of the nation, which will be supplied by both oil and gas from domestic sources, will be about 22.3 million barrels daily. Of this, oil should supply 14,400,000 b/d and gas the equivalent of 7,940,000 b/d. Gas has been taking an increasing share of the energy market recently, and estimates vary considerably as to the share it will attain in the next decade. If the domestic supply of hydrocarbons reaches 22,300,000 b/d of crude-oil equivalent by 1967, it will be necessary to import about 7,700,000 b/d of crude to meet the expected demand of 30,000,000 b/d.

Capital requirements of the domestic industry will continue very large during the next decade. In the past 10 years the producing branch has made capital investments totaling $35 billion in the production branch of the industry. Within 10 years it may be necessary to increase capital outlays for crude to more than $7 billion per year.

NATURAL GAS: Gross production of natural gas in the United States was virtually unchanged in 1958. Total for the year was 12,940 billion cubic feet, compared with 12,907 billion cubic feet in 1957. Marketed production increased a little less than 1% to 10,784 billion cubic feet.

At the end of the year the natural-gas distributing industry had 19,074,000 domestic heating customers, compared with 17,924,000 on January 1. The increase of 1,150,000 during the year was much more rapid than the increase in domestic fuel-oil customers.

(Continued)

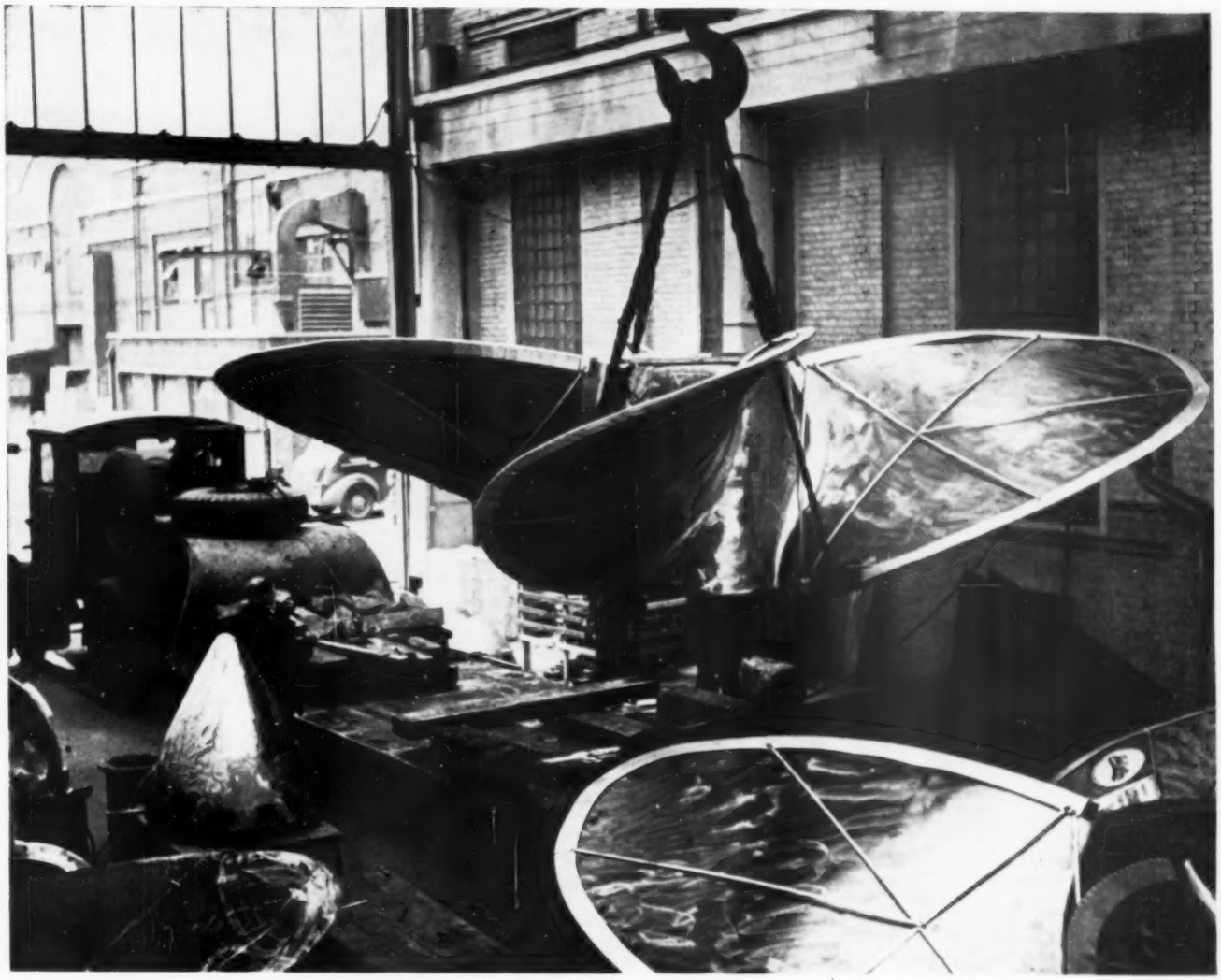
TABLE I
USA SUPPLY AND DEMAND OF ALL OILS
(Thousands of Barrels Daily)

Supply	1958	1957	1956
Crude production	6,743	7,170	7,151
Natural gasoline	793	809	801
Total domestic supply	7,536	7,979	7,952
Imports, all oils	1,670	1,574	1,436
Total supply	9,206	9,553	9,388
Demand			
Domestic demand	8,949	8,818	8,779
Exports, all oils	279	568	430
Total demand	9,228	9,386	9,209

TABLE II—USA PETROLEUM SUPPLY AND DEMAND FORECAST
(Thousands of barrels daily, except closing stocks)

	Year 1958	1st Q 1959	2d Q 1959	3d Q 1959	4th Q 1959	Year 1959
DOMESTIC DEMAND						
Gasoline	3,873	3,595	4,190	4,230	3,950	3,991
Kerosine	314	490	175	200	430	324
Distillate	1,768	2,635	1,350	1,240	2,220	1,861
Residual	1,434	1,735	1,325	1,255	1,585	1,475
Other	1,603	1,615	1,710	1,910	1,760	1,749
TOTAL	8,992	10,070	8,750	8,835	9,945	9,400
EXPORTS						
Gasoline	71	65	70	70	60	66
Kerosine	3	5	5	5	5	5
Distillate	55	55	50	50	55	53
Residual	66	60	60	60	60	60
Other	74	75	70	75	70	73
TOTAL	269	260	255	260	250	257
TOTAL DEMAND (Including Exports)	9,261	10,330	9,005	9,095	10,195	9,657
TOTAL STOCK CHANGE	—130	—623	+517	+510	—336	+20
TOTAL NEW SUPPLY REQUIRED	9,131	9,707	9,522	9,605	9,859	9,677
CLOSING STOCKS (Million bbls.)						
Gasoline	187	209	184	174	188	188
Kerosine	26	17	25	32	27	27
Distillate	132	71	106	158	134	134
Residual	64	56	62	67	62	62
Other Products & Natural Gas Liquids	135	135	148	141	135	135
Crude	250	250	260	260	255	255
TOTAL	794	738	785	832	801	801

Source: Supply and Demand Committee, Independent Petroleum Assn. of America.



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UNITED STATES *(continued)*

Early in December, the natural-gas industry was heartened by a decision of the US Supreme Court in the Memphis case which permits gas compainies to increase their prices on service-type contracts as costs advance and without waiting for a final decision by rate-making bodies. Under the "Memphis case" which had been upheld by the US Court of Appeals, a pipeline could advance prices on short notice only if all its customers agreed to accept the increase pending final adjudication. Following the original Memphis decision, a number of gas companies retarded their plans for expansion.

Drilling with gas as an objective was not active in 1958 because of market conditions, although no precise statistics on this subject are available. Proved reserves of gas had not increased at the previous rate in 1957, and it is assumed the same trend continued in 1958. In 1955, reserves had risen 12 trillion cubic feet; in 1956 this increase was up to 14 trillion; while in 1957 the rise was only 8.8 trillion, to 246.6 trillion.

To improve its ability to take care of winter peaks in demand, the gas industry is continuing to develop new underground storage projects as near consuming centers as possible. The American Gas Assn. estimates that reservoir capacity at the end of 1958 totaled 2.9 trillion cubic feet, compared with 2.6 trillion a year earlier and 1.7 trillion at the end of 1953.

A tank steamer was built in 1958 for the transportation of liquefied methane overseas. The vessel was on sea trials at the end of the year. Plan is to liquefy the gas at minus 250 F for transportation in carefully insulated tanks and to revaporize the gas at destination.

LPGas: The liquefied petroleum gas division of the industry enjoyed an increase of 9.4% in sales in 1958, to 7,591 million gallons. Aided by a long cold wave in the Southeast during February and March, the consumption for domestic and industrial use zoomed 15.2% to 3,534 million gallons. Motor-fuel use was up 2% to 821 million gallons; petrochemical use rose 7.9% to 1,869 million gallons; but rubber manufacturers cut back their purchases 13% to 364 million gallons.

Following conversion of the Little Big Inch pipeline from gas to liquid products in 1958, it was possible to ship LPGas from the Gulf Coast to Ohio.

REFINING: Capital investment in refining facilities toaled about $900 million in 1958. This was a reduction of about $50 million from 1957, but was $75 million higher than 1956.

Based on 1958 consumption, there was surplus crude capacity available, with the result that construction in this area was curtailed. Much of the building was of specialized units for product improvement.

Refinery crude runs averaged 7,600,000 b/d, compared with 7,919,000 b/d in 1957, a drop of 4.1%. Runs were also below the 1956 level of 7,937,500 b/d. Operable plants were running at about 80% of rated capacity.

A survey by the American Petroleum Institute showed plant capacity on September 30 to be 9,743,700 bbl, of which 60,000 bbl was shut down and in need of major repairs. Capacities at the close of each of the five previous years follow:

1957	9,407,707
1956	9,123,674
1955	8,632,390
1954	8,420,630
1953	8,006,897

IMPORTS: With the landed cost of Middle East crude at East Coast refineries about 50¢ per barrel less than Mid Continent oil, the economic pressure to bring in these oils was great throughout 1958. Independent producers carried on a steady campaign to limit imports as a means of insulating domestic markets against lower-cost oil.

Under Captain Matthew V. Carson, Jr., of the President's committee charged with solving the import situation, a number of plans were evolved under which it was hoped imports would be restricted on a voluntary basis. An effort was made to permit new importers to bring in cheap oil without penalizing long-established importers too severely. None of the plans worked very well, and at the end of the year some consideration was being given to mandatory controls by one means or another—possibly even by setting up quotas for various producing nations.

Imports of crude and products in recent years are shown as follows:

Year	Crude	Products	Total
	(Barrels Daily)		
1958*	937,000	733,000	1,670,000
1957	1,022,600	551,600	1,574,200
1956	934,000	502,000	1,436,000
1955	782,000	466,100	1,248,100
1954	656,100	395,800	1,051,900

* Estimated

FINANCIAL: First-half earnings of USA oil companies were sharply lower than in 1957, but there was a relative improvement in the third and fourth quarters. Earnings of 58 companies in the first nine months totaled $2,094 million compared with $2,874 million in the same period in 1957. Reduction was 27.1%. Of the 58 companies, only three reported deficits in the nine months. One of these had a loss in 1957 also.

UNITED STATES — Summary of Petroleum Statistics

	YEAR TO DATE		
	1958*	1957	Change
	Thousands of Barrels		%
Demand—Daily Average			
Gasoline	3,956	3,922	+ 0.9
Kerosine	314	309	+ 1.6
Distillate fuel	1,844	1,819	+ 1.4
Residual fuel	1,494	1,610	— 7.2
4 Major Products	7,608	7,660	— 0.7
All Other	1,710	1,726	— 0.9
Total Demand	9,318	9,386	— 0.7
New Supply—Daily Average			
Crude-oil production			
U.S.A. excl. West Coast	5,845	6,239	— 6.3
West Coast	862	931	— 7.4
Total Crude Production	6,707	7,170	— 6.5
Natural-Gas Liquids Production	798	809	— 1.4
Total Domestic Production	7,505	7,979	— 6.0
Crude-Oil Imports			
U.S.A. excl. West Coast	768	763	+ 0.7
West Coast	185	260	—28.9
Total Crude Imports	953	1,023	— 6.8
Refined Products Imports	716	551	+29.9
Total Imports	1,669	1,574	+ 6.0
Total New Supply	9,174	9,553	— 4.0
Stock Change			
Daily average	— 144	+ 167	—
Period	—52,714	+60,926	—
Crude Runs to Stills—Daily Average			
Domestic crude	6,651	6,931	— 4.0
Foreign crude	954	988	— 3.5
Total Crude Runs to Stills	7,605	7,919	— 4.0
Stocks—End of Period			
Gasoline	—	—	—
Kerosine	—	—	—
Distillate fuel	—	—	—
Residual fuel	—	—	—
Other products	—	—	—
Total Products	—	—	—
Crude Oil	—	—	—
Total—All Oils	—	—	—
Refinery Yield	Percent		
Gasoline***	50.8	49.0	—
Kerosine	3.9	3.8	—
Distillate fuel	22.8	23.1	—
Residual fuel	13.0	14.4	—

* Source: 10 Months Bureau of Mines; 2 Months API Supplementary Data. All data by Chase Manhattan Bank.

OIL LAWS*

The depletion allowance given oil and other extractive industries when the income-tax law first was adopted in 1913 has been subject to political attack at frequent intervals since. Recently, certain members of Congress have returned to the attack time after time, asserting that the allowance is a means of tax avoidance by the industry and not justified. In recent years, Texas independent producers who have been lucky as wildcatters have been targets. Efforts have been made to reduce the allowance to big companies and to make an across-the-board cut to 15%.

In 1958 the foreign-domestic oil controversy gave a new twist to the attack. Congress in 1959 is likely to consider canceling the allowance on oil produced in foreign countries while retaining the tax concession on domestic oil.

The present allowance of 27½% for depletion of reserves was reached by compromise between the House and Senate in 1926, and has been undisturbed at that level for 32 years. It is limited to the individual producing property, and may not exceed 50% of the net income from each lease. Government policy during the past 32 years has been that discovery of new oil should be encouraged and that the depletion allowance is an effective way of creating capital for wildcatting.

Many of the more than 20,700 bills considered by last year's 85th Congress were of direct concern to the petroleum industry, notably in the areas of antitrust and trade practices and petroleum taxation. More of the same can be expected in the 86th Congress.

New moves are expected to be made to reduce the percentage depletion rate on oil and gas production or to eliminate it entirely for foreign oil. Backers of a percentage depletion cut displayed greater strength in last year's session. A roll-call vote on an amendment by Senator John J. Williams (R., Del.) to establish a 15% rate was 26 yeas and 63 nays. Another amendment offered by Senator William Proxmire (D., Wis.), which called for a sliding scale of depletion rates, received 31 yeas to 58 nays. The last previous roll-call vote came in 1951 when the Senate rejected by 71 to 9 the Humphrey amendment to reduce the rate to 15%.

The administration has already voiced its call for a 1½-cent-a-gallon increase in the federal gasoline tax to meet an expected $900 million deficit in the highway trust fund. Trade, business, and highway-user groups across the nation have registered strong opposition.

Measures to bar a seller's right to plead competitive "good faith" as a complete defense to a price-discrimination charge failed to pass in the last session, and are sure to be reintroduced. A bill to amend the Robinson-Patman act to make functional discounts mandatory, which also failed, will be back. It provides that functional discounts should be based on the manner in which a purchaser sells rather than on how he buys.

The Harris-O'Hara natural-gas bill, which would have altered the basis of federal regulation of natural-gas prices, was reported favorably by the House Commerce Committee, but was never scheduled for a vote. A bill to re-

(Continued)

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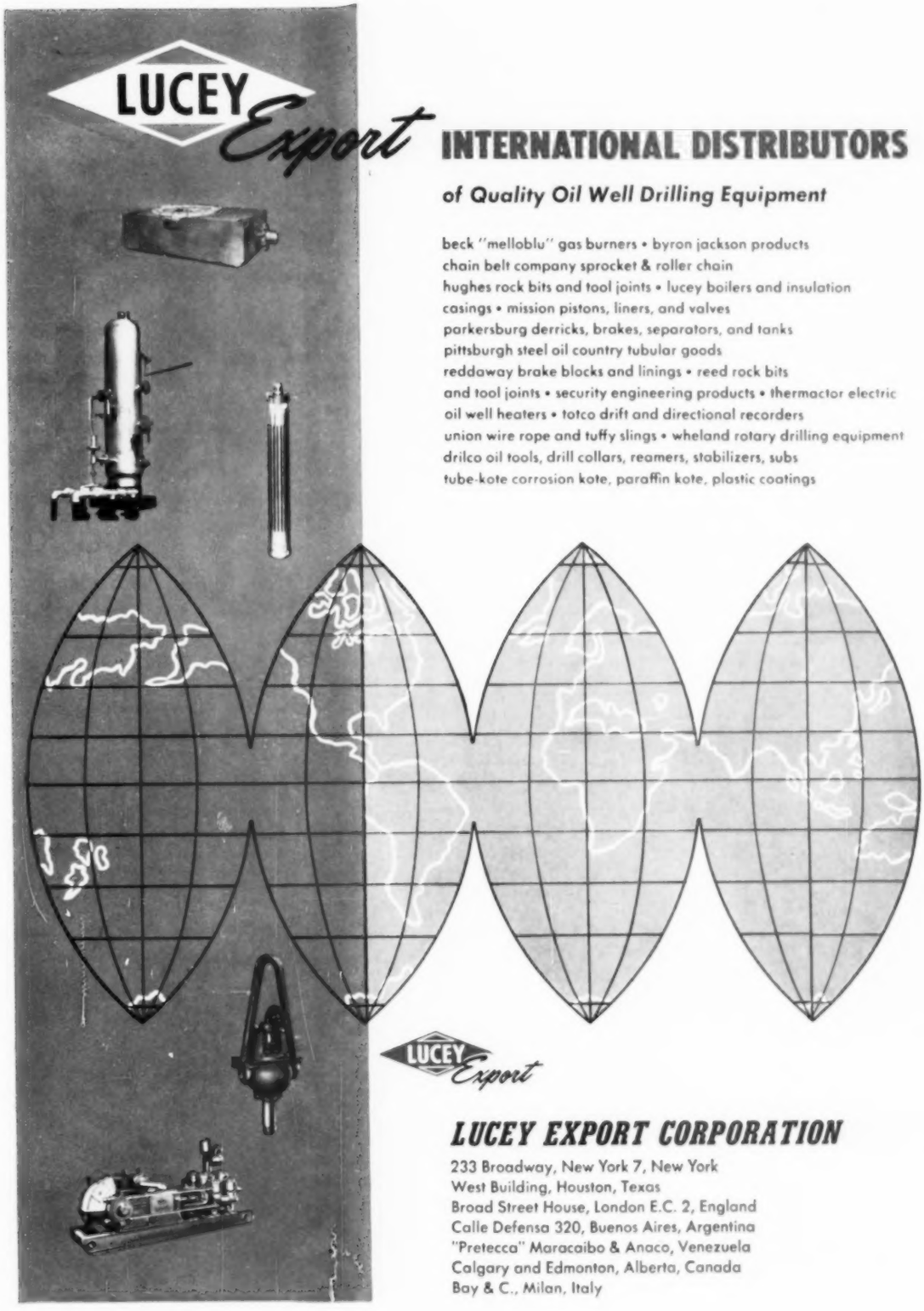

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lieve from Federal Power Commission controls independent natural-gas producers selling less than two billion cubic feet of natural gas annually in interstate commerce received no action.

Lawmakers in 46 states, including the new state of Alaska, are scheduled to convene in this busy legislative year. Only states not holding regular sessions are Kentucky, Mississippi, and Virginia. Estimates based on previous heavy legislative years put the number of bills likely to be introduced as high as 100,000, with as many as 10,000 touching on the oil industry and its customers.

The need for more revenue, particularly for road building, will give rise to many calls for new or increased taxes on the state and local levels. Indications are that proposals for gasoline-tax increases ranging from one to two cents a gallon may be sought in at least 25 states: Alabama, Arkansas, California, Delaware, Florida, Illinois, Kansas, Maine, Massachusetts, Minnesota, Missouri, Montana, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, Washington, West Virginia, and Wisconsin. Strong drives will be made in some states to eliminate exemption of gasoline from state sales-tax laws.

Measures calling for the inclusion of "free enterprise" provisions prohibiting erection of service facilities on state-owned rights-of-way as part of their limited-access highway laws will be introduced in a number of states. Sixteen states have thus far enacted such provisions, which back up and expand the scope of the policy expressed by Congress with regard to the federal interstate system.

Bills to regulate in one way or another the marketing of petroleum products will be brought forth in a number of states, particularly in the northeastern sector of the country. Other regulatory measures concerned with air-pollution control, fuel inspection, fire codes, storage facilities, hydraulic brake fluid standards, weights and measures, and the like will also be introduced in some states.

The petroleum industry also can expect a heavy volume of proposed legislation concerned with petroleum tank trucks, ton-mile taxes on trucks, motor-vehicle sizes and weights, diversion of highway funds, sales taxes, chain-store taxes, gasoline-tax exemptions and refunds, severance taxes, and a host of other matters. END

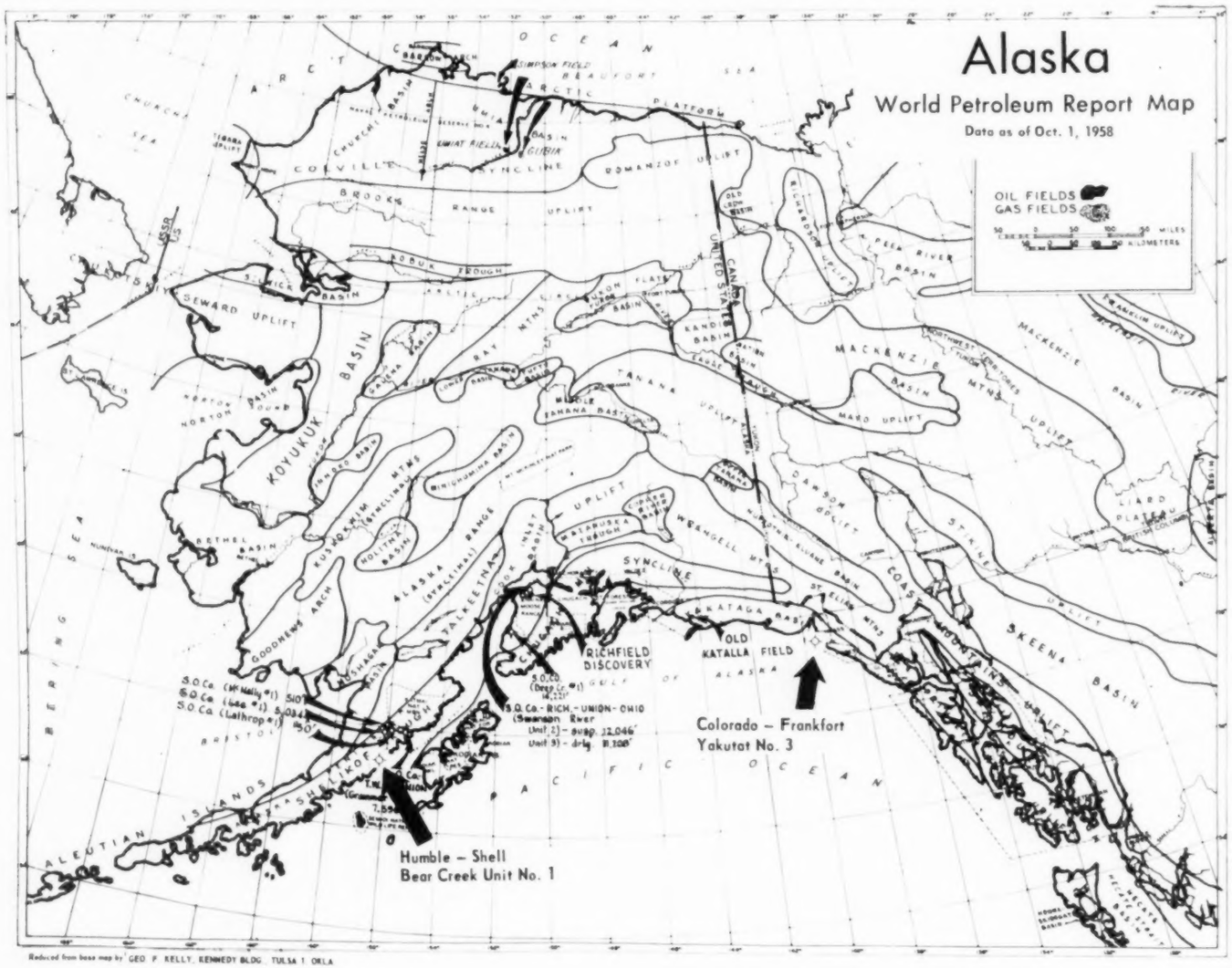
ALASKA

PHYSICAL DEVELOPMENT

EXPLORATION: Alaska is the scene of an oil boom, following a discovery by Richfield Oil Corp. (see *World Petroleum Report—1958*). Drilling in 1958 totaled 49,937 ft, and almost every major company has acquired acreage or augmented lease holdings. More surprising perhaps has been the entry of many individuals or associations of individuals. A resumé of the leasings by potential oil provinces is shown in an accompanying table.

The table indicates a continuing trend which started with the Richfield discovery in July 1957, and has accelerated with interest extending into all the prominent basins. Yet with estimates of the potential petroleum areas varying from 90 to 130 million acres, it is safe to assume present leasings will continue. The leases being acquired in Alaska are on federal lands. Less

(*Continued*)



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ALASKA *(continued)*

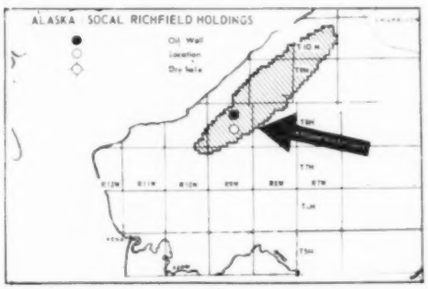
than 1% of the 375 million acres comprising Alaska are under survey. Of the surveyed lands, many of which are potential and in private ownership, perhaps 30,000 acres have been leased. The balance of land is under favorable federal jurisdiction.

ALASKA—Leasing Activity

Basins	Acres 1958	1957
Arctic Slope	281,915	—
Yakataga-Katalla	2,560	230,240
Kateel-Koyukuk	1,074,060	3,093,616
Kuskokwinn	3,723,560	263,680
Copper River	456,650	1,817,960
Porcupine-Kandik	1,889,406	2,692,686
Aleutian	1,274,755	903,700
Mushagak	2,639,841	4,901,434
Cook Inlet	2,246,244	2,576,383

However, the emphasis here placed on lease acquisition and land policies (see Oil Laws Section this report) should not completely overshadow the intense exploratory work done during the past field-season which normally runs from about June 1 through September 15. Using an estimated 60 helicopters, at least 20 companies had one or more field parties doing detailed mapping or general reconnaissance in all the major provinces indicated on the accompanying map. It is believed this is but an indication of the exploratory work to be expected during 1960.

Drilling has not had the upsurge many had predicted following the July 1957 discovery. Three new wells have been drilled since that date. Humble-Shell Bear Creek Unit No. 1, recently drilling at 12,683 ft, has been plagued with mechanical troubles and normal handicaps aggravated by weather conditions. While encountering numerous shows, it has apparently failed to reach a commercial objective at this writing. The Standard-Richfield Swanson River Unit No. 2 and No. 3 wells must be classed, respectively, as a secondary exploratory well and a development stepout. Information on all three unit wells has been limited. The announcement on No. 1 discovery rated the well as capable of 950 b/d of 32.6-gravity, 122 mcf 1½-in. bean cut back to a 9/64-in. choke rated at 360 b/d, 50 mcf. Recently it was producing 500 b/d. While No. 2 was undergoing tests (as of 12/16/58), it was reported that the interval between 11,038 ft and 11,060 ft tested 300 b/d to 500 b/d. The Hemlock zone producing in No. 1 has not been tested. No. 3 was abandoned, November 21, 1958, at 11,653 ft as dry. Deep Creek Unit No. 1, located 55 miles south, was a wildcat well located on seismic evidence, and was abandoned at 14,221 ft (TD). There were reported shows, but these have not been confirmed. Rosetta No. 3, drilled in the Matanuska Valley, reportedly had oil and gas shows, but extensive testing has failed to indicate the presence of a commercial well at the depth reached.



Future drilling plans were uncertain late in 1958, with major companies reluctant to make any commitments. Halasko Inc., Alaskan company of Michel T. Halbouty, has announced plans to drill a well 5½ miles southwest of Richfield Swanson Unit No. 1. Road building has been under way, with spud date expected in January.

Standard-Richfield Swanson No. 4 was expected to begin drilling in January 1959. Alaska Consolidated Oil, which has acquired the properties of Russell E. Havenstrite and associates, located on the Iniskin peninsula, has announced plans to drill there in 1959. While Humble Oil and Refining Co. has further well commitments on the Alaskan peninsula, future plans have not yet been announced. Continental Oil Co. has announced plans (*World Petroleum*, October 1958) to join Colorado Oil and Gas and Frankfort Oil Co. in exploration of 1,100,000 acres in the Yakatat area of the Yakataga-Katalla basin which should insure future drilling in this province. General Petroleum has a contingent obligation to drill in the Mushagak basin on lands held by Great-Basins Petroleum Co., Reserve Oil and Gas Co., Republic Natural Gas Co., and Hudson Gas and Oil Companies, prior to June 15, 1959.

A number of bids have been received on the Gubik gas field. Payments offered ranged from $1.07 to $15.27 per acre. The area was developed by the government, and was split into 26 blocks for leasing. It is the most northerly oil or gas field in the Western Hemisphere.

List gives name of well, elevation/depth and date completed. (Numbers in left column correspond to numbers on map)

(1) South Barrow Test Well—1 100/3553' (1948)
(2) South Barrow Test Well—2 100/2505' (1949)
South Barrow Test Well—3 /3456'
(3) South Barrow Test Well—3 100/2900' (1949)
(4) South Barrow Test Well—4 100/2538' (1950)
(5) Avak Test Well—1 /4020' (1932)
(6) North Simpson Test—1 100/3774' (1950)
(7) Simpson Test Well—1 /7002' (1948)
(8) Topagoruk Test Well—1 100/10,503' (1951)
(9) East Topagoruk Test Well—1 /3589' (1951)
(10) Fish Creek Test Well—1 100/7020' (1949)
(11) Kaolak Test Well—1 /6952' (1951)
(12) Meade Test Well—1 200/5306' (1950)
(13) Oumalik Test Well—1 500/11,872' (1950)
(14) East Oumalik Test Well—1 /6033' (1951)
(15) Square Lake Test Well—1 /3987' (1952)
(16) Titaluk Test Well—1 /4020' (1951)
(17) Wolf Creek Test Well—1 /1500' (1951)
(18) Wolf Creek Test Well—2 /1618' (1951)
(19) Wolf Creek Test Well—3 /3760' (1952)
(20) Gubik Test Well—1 400/6000' (1951)
(21) Gubik Test Well—2 400/4620' (1952)
(22) Knife Blade Test Well—1 /1865' (1951)
(23) Knife Blade Test Well—2 (1951) /372' and 2A /1805'
(24) Grandstand Test Well—1 /3939' (1952)
(25) Umiat Test Well—1 400/6005' (1946)
(26) Umiat Test Wells—2-11 (1946-52) 400/
2) 6212'
3) 572'
4) 840'
5) 1077'
6) 825'
7) 1374'
8) 1327'
9) 1257'
10) 1573'
11) 3303'
(27) S. Peor (and others) 4 shallow holes (1906-1918)
(28) Peterson Oil & Gas 2200/1465' (1932)
(29) Alede Oil & Alaska O & G Eureka—1 3000/4820' (1957)
(30) Anchorage Gas & Oil Rosetta—1 330/3880' (1955)
(31) Anchorage Gas & Oil Rosetta—2 293/1100' (1956)
(32) Anchorage Gas & Oil Rosetta—3 300/6054' (Spudded—1956)
(33) Alaska Gulf Oil & Gas 100/3855' (1955)
(34) Alaska Oil Co. (2 shallow wells) (1902 & 1903)
(35) Alaska Petroleum Co. (4 shallow wells) (1903-1906)
(36) Iniskin Drilling Co. I.B.A. 300/9775' (1939)
(37) Iniskin Unit Operator Iniskin—1 350/9?? (1955)
(38) Pacific Oil & Commercial Co.—1 /1421' (1904)
Pacific Oil & Commercial Co.—2 /1542' (1905)
(39) J. H. Costello Co.—1 /15' and 2 /728' (1903)
(40) Tidewater Associated Alaska—1 694/3033' (1925)
Tidewater Associated Finnegan—1 /560' (1926)
(41) Standard of Calif. Lee—1 764/5034' (1926)
Standard of Calif. McNally /510' (1925)
Standard of Calif. Lathrop (1924)
(42) Standard Union Tidewater Grammer—1 375/7596'
(43) Humble-Shell Bear Creek Unit—1 913/10,935' (Spudded—1957)
(44) Chilkat Oil Co. Katalla Field (37 shallow wells) (1902-1933)
(45) General Petroleum Sullivan—1 265/2005' (1927)
(46) Phillips Kerr-McGee Sullivan Strat—1 250/4837' (1954)
(47) Phillips Sullivan Unit—1 340/10,013' (1955)
(48) Phillips Sullivan Unit—2 300/12,054' (1957)
(49) Colorado Oil & Gas Frankfort-Yakutat—1 49/9314' (1957)
(50) Colorado Oil & Gas Frankfort-Yakutat—2 40/11,765' (1958)
(51) Richfield Swanson River Unit—1 360/12,384' (1957)
(52) Richfield Swanson River Unit—2 258/12,045' (1958)
(53) Standard-Richfield Deep Creek Unit—1 624/14,221' (1958)
(54) Colorado Oil & Gas Frankfort-Yakutat—3 /6,000' (Spudded—1958)
(55) Standard-Richfield Swanson River Unit—3

Source: Alaska Scouting Service, P.O. Box 2278, Anchorage, Alaska. Drillers' logs available for some of above listed wells.

PRODUCTION, REFINING, MARKETING: Before World War II the Katalla field, owned by Standard of California, produced about 155,-

(*Continued*)

000 bbl of high-grade crude before depletion. The government has three shut-in oil fields and four gas fields in its Naval Petroleum Reserve No. 4, an area of some 35,000 square miles just south of Point Barrow.

During late 1958 the first shipment of crude from Richfield's Swanson River Unit reached the Richmond refinery of Standard of California in San Francisco. If the potential of this field, estimated at a billion barrels by noncompany sources, lives up to its advance billing, it will become a major source of supply.

There is no refining in Alaska. The announced 3,000 b/d refinery at Haines (see *World Petroleum Report—1958*) has just been begun. Pipelines described previously have not yet been begun. There are no crude pipelines in the country, and the only product pipelines are military.

Reserves: Naval Petroleum Reserve No. 4 was established by Interior Secretary Seaton in November 1958 to have at least five to seven billion cubic feet of natural-gas reserves. Gubik field was estimated to have at least 222 billion cubic feet. Previous estimates of oil reserves in the Naval Petroleum Reserve No. 4 were 500,000 bbl. No reliable estimate is available on the reserves in the Richfield Swanson River Unit; however, the structure covers about 75,000 acres, and reserves may be substantial.

OIL LAWS*

Alaska's new statehood has changed the oil regulation of the very extensive federal lands and made them conform to the regular USA regulation, eliminating the special provisions described in *World Petroleum Report—1958*. As of May 5, 1958, by legislation, rates have been raised to $.50 per acre first-year rental; second and third years, free; fourth and fifth years, $.25 per acre; sixth through tenth, $.50 per acre, placing the leasing of lands in Alaska on the same basis as lands in the continental United States.

Statehood is not expected to change the pattern of leasing activity. State selection of lands cannot affect existing leases, and it is believed existing applications for leases will also be protected. The immediate effect of statehood will be to transfer to the state the right to lease those lands lying below mean high tide out to the three-mile limit. Beyond that limit, the provisions of the Outer Continental Shelf Act will apply. The opening of these lands to leasing and exploration will be greeted with interest, particularly as it affects the Cook Inlet basin, where existing lease blocks would normally include submerged water areas had those areas been previously available for lease. If the present recommendations of the Territorial Land Board are followed, these tidelands and submerged lands will be offered at competitive bid. *Copies of all applicable laws are kept on file at the New York offices of World Petroleum Report, 604 Fifth Avenue, New York 20, N.Y.*

OIL LAW SUMMARY 1959*

Under statehood, Alaska may select and withdraw for its own use approximately 27% of all land in Alaska—approximately 100,000 acres. However, for the present, oil and gas leases in Alaska are being handled by the Bureau of Land Management of the US Department of Interior, and consist of two types of leases:

COMPETITIVE LEASES: Issued for lands within a known geological structure of a producing oil or gas field. Issued through competitive bidding only to the qualified bidder who submits the highest bid as a bonus for the privilege of obtaining the lease. Issued for a term of five years and so long thereafter as production is in paying quantities. Annual rental on these leases is $1.00 per acre for each lease year, with royalty on any production obtained under the lease of not less than 12½%. The Director of the Geological Survey determines the boundaries of the known geological structures of producing oil and gas fields.

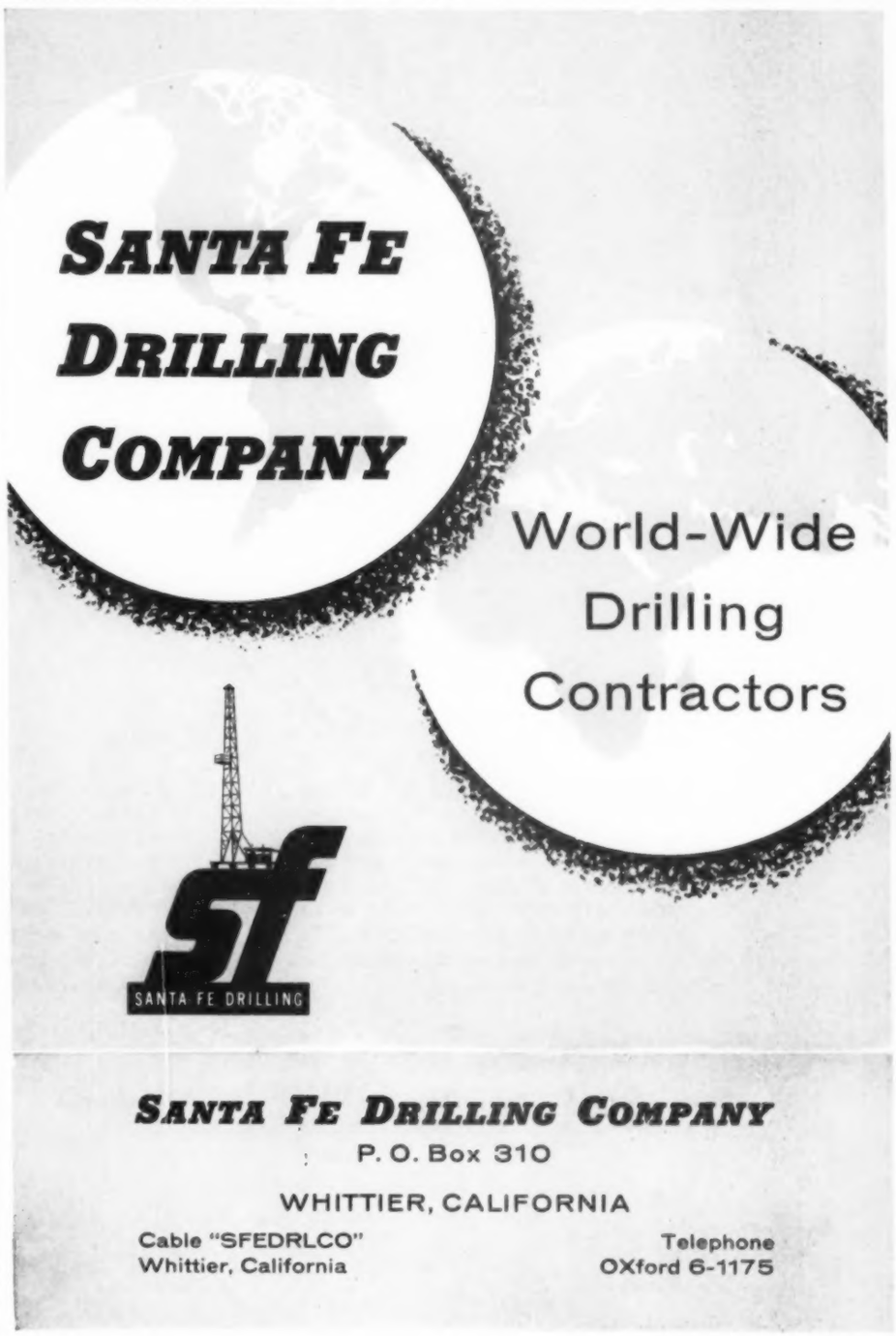
NONCOMPETITIVE LEASES: Issued for lands not within such known geological structures. Issued to the first qualified applicant making an offer for a lease, for a period of five years and so long as oil or gas is produced in paying quantities. Annual rental is charged at the rate of 50 cents per acre for the first year, no rental for the second and third lease years, and 25 cents per acre for the fourth and fifth lease years. A noncompetitive lease is subject to a single 5-year extension under certain conditions at a rental of 25 cents an acre for the sixth and each succeeding lease year. Royalty on production is payable at the rate of 5% for 10 years after discovery and at the rate of 12½% thereafter.

No lease will be issued unless it has been shown that the lessee or transferee is entitled to hold the acreage.

Although there is a limitation of 100,000 acres maximum lease holdings in Alaska by any one company or individual, unit plans and communization of drilling agreements may be secured without regard to acreage limitations provided they meet with the approval of the secretary. Such exception is intended to permit a number of operators to enter into development contracts sufficient to justify operations on a large scale

(Continued)

* Complete text of oil laws are kept on file at the offices of *World Petroleum Legislation Report*, 604 Fifth Ave., New York 20, N.Y. (see p. 22 herein).



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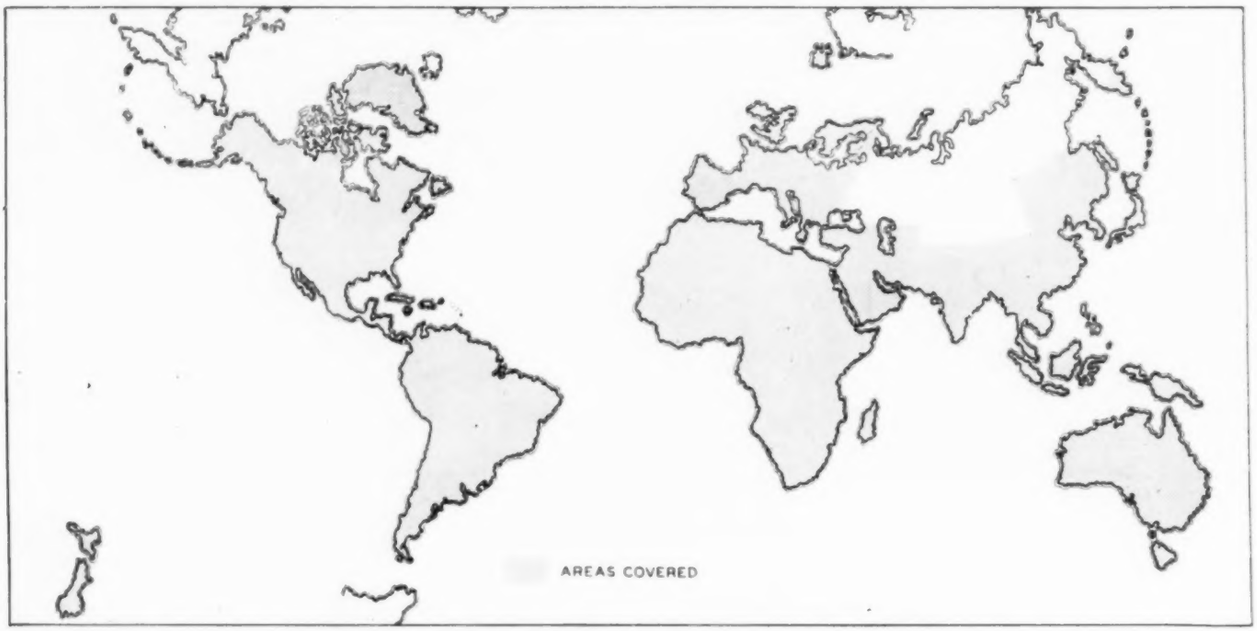

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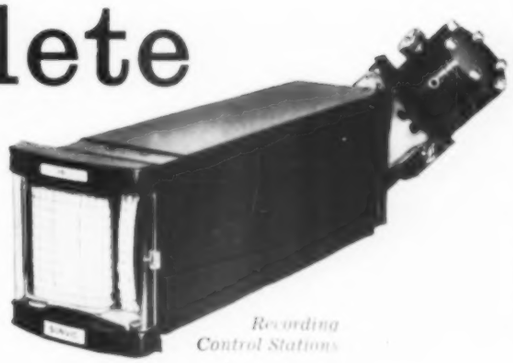

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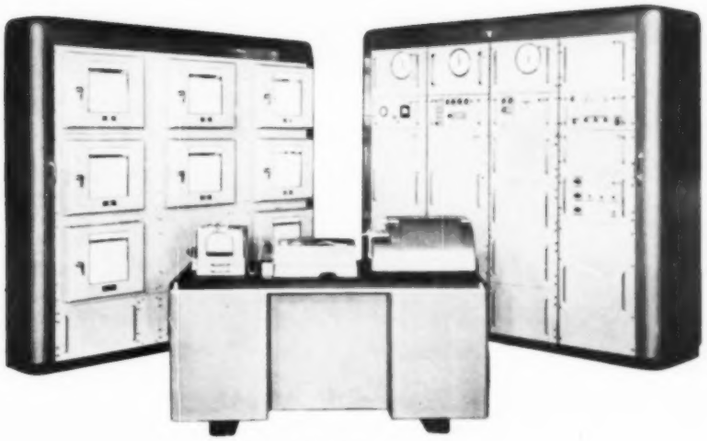

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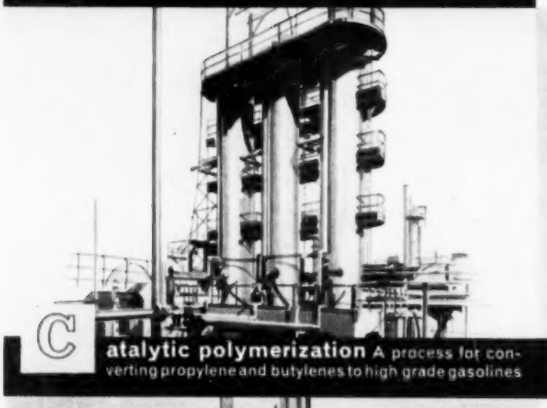

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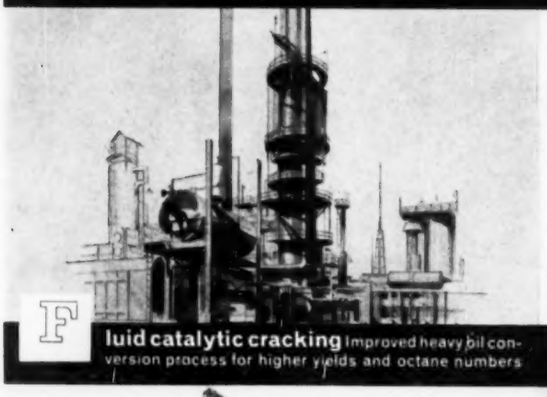

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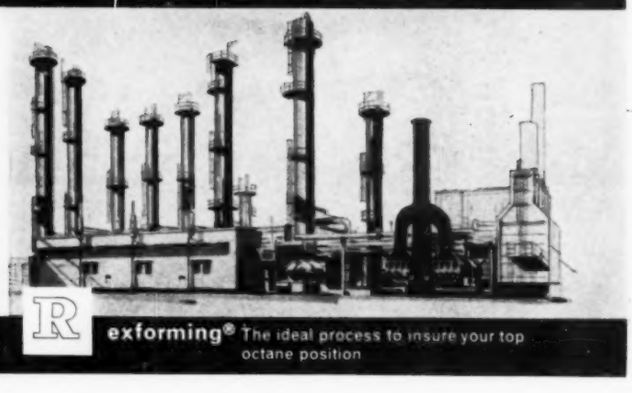

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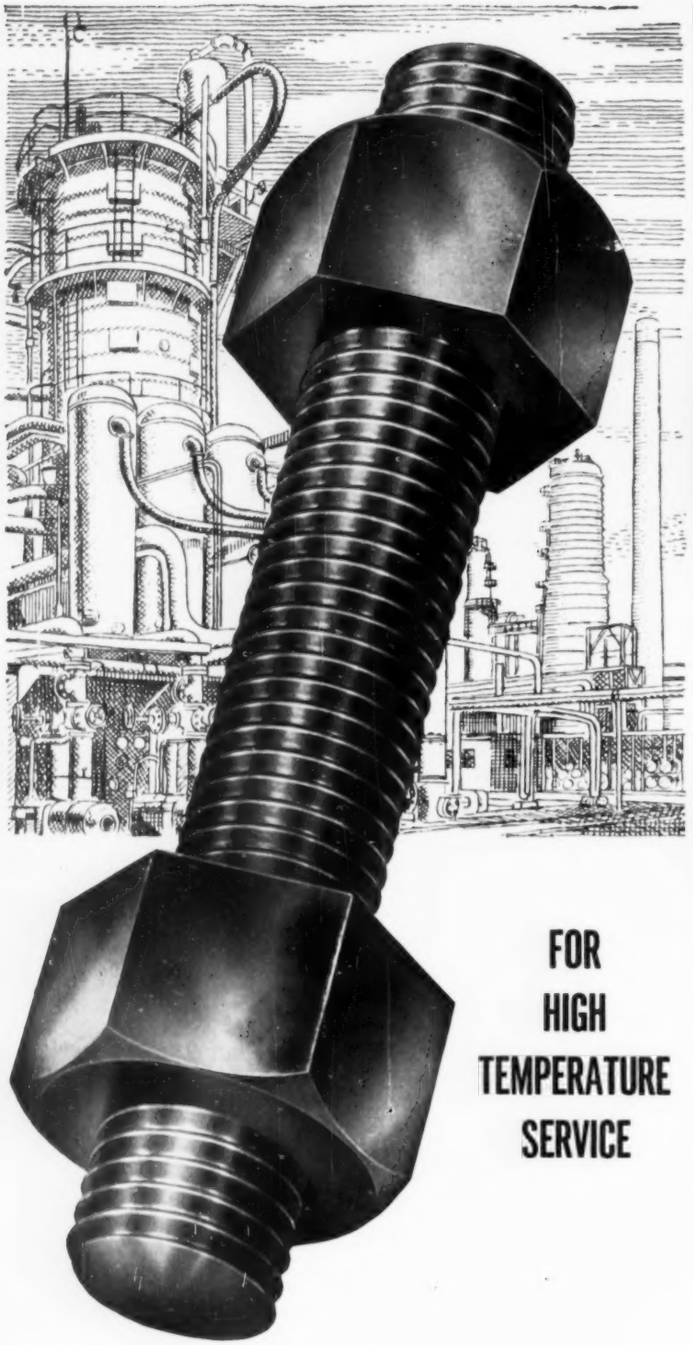

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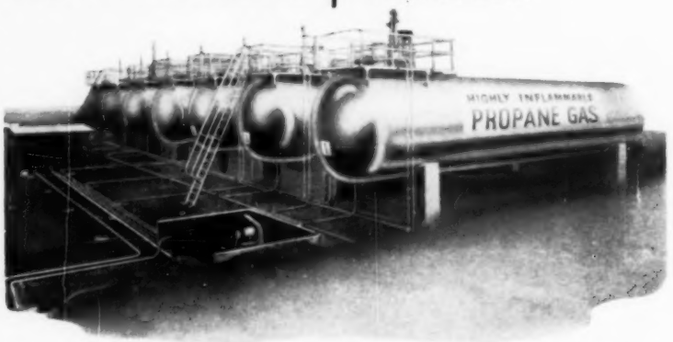

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ALASKA ***(continued)***

NATIONAL FACTORS

Alaska's admission as a state of the United States is certain to have great favorable impact on her oil development. It means (as did territorial status) that oil produced can be imported into the continental United States without being subject to quota. Other significant points are as follows: Of the state's 375.3 million acres, about 110 million are classified as geologically favorable to oil development, of which about 24 million acres are within the Navy's Petroleum Reserve No. 4 and another two million in the Kenai Moose Range. Only about 30 million of the remaining 80 million acres have been leased, and this will probably all be gone by 1960. Alaska has the right to choose 103 million acres over 20 years to support statehood, which may be chosen after oil work has been done.

Rating: The analysis of the principal favorable factors involved in Alaskan work shows the following favorable features: (1) *Monetary:* There would be no exchange problems. (2) *Royalty and Taxes:* Royalty rates would probably not exceed 12½%. The United States income tax would apply, plus a state tax amounting to about a 10% surcharge on the USA tax. Other state taxes are extremely low. (3) *Security:* Capital investment would be as secure as in the United States.

The principal unfavorable factors are the following: (1) *Geography and Climate:* This region is far from world markets. The climate would make year-round operations difficult and expensive. (2) *Capital Investment:* It is probable that large capital investment would be required. (3) *Marketing:* High production and transportation costs would virtually restrict competitive marketing of Alaska peninsula crude to the west coast of the United States. (4) *Earnings:* The foregoing factors indicate that payout would not compare favorably with estimates for exploration and development programs of average attractiveness, either domestic or foreign.

Note: Recent publications on Alaska include: *The Alaskan Oil and Gas Handbook*, by A. Troutman, geological review with maps, published by Oil Frontiers, P. O. Box 2211, Capital Station, Austin 11, Texas. *The Alaska Petroleum Directory* published by Petroleum Publications Inc., P. O. Box 399, Anchorage, Alaska ($7.50).

CANADA

PHYSICAL DEVELOPMENT

EXPLORATION: Geophysical crew-months in 1958 reached a new low since the 1952 high point—with estimated 1,100 months worked, a decline of 234 months, or 17½%, from the 1,334 in 1957. The trend of exploration activity paralleled a decline in crude markets and slackened wildcat drilling. With a greatly reduced scale of operations, 1,000 crew-months has been estimated adequate for 1959.

A forecast indicates there would be continuous work for about 180 rigs during the next five years.

Well completions also slumped during 1958. Offset obligations stimulated increased development drilling in Alberta; while Saskatchewan was short of both new discoveries and desirable sites for development completions. Total 1958 completions, estimated at 2,550, were down 14% from 2,962 in 1957. Factors in the downward trend include (1) wider well spacing—mostly 80-acre, but some 160-acre well spacing in new fields—providing access to as much oil as the larger number of 1957 completions; (2) lack of money and high interest rates during the business depression, causing many companies to reconsider new expenditures.

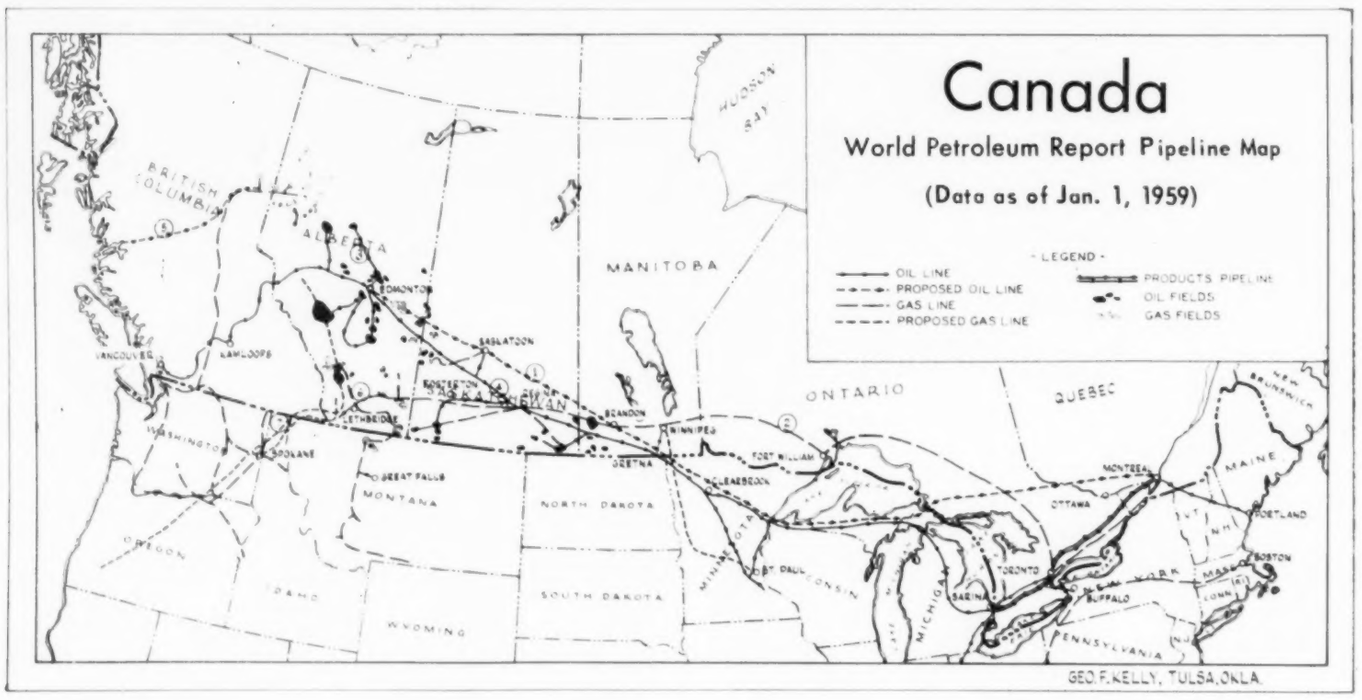
Total Alberta completions of 1,605 were up from the 1,417 in 1957. Development wells totaled 1,295 and wildcats 310, against 1,063 developments and 354 wildcats in 1957. Saskatchewan's 764 total completions were down sharply from 1,231 in 1957. Developments numbered 578 and wildcats 186, against 961 and 270, respectively, in 1957.

The smaller provinces also were down. Manitoba's well completions slumped to 94 (81 developments, 13 wildcats) from 224 (160 developments, 64 wildcats) in 1957. British Columbia's total declined moderately to 87 from 91 in 1957. Developments dropped to 42 from 55, but wildcats soared to 45 from 36.

Alberta: With many minor oil discoveries during 1958, by year-end only three were significant. Pan American and British American's discovery at Morse River, near Swan Hills oil field, was followed up late in November by what is believed Swan Hills' best well, Pan Am-BA 14-33-66-10, a two-mile extension to this rapidly developing major field. Over 300 ft of net pay zone is indicated. The third strike, Shell of Canada's Simonette 12-9-63-25, an oil and gas discovery, is being completed an oil well. Early in December it sparked four simultaneous stepouts 1¼ to 2¾ miles distant. Dual production of oil, with a thick gas cap, was from the Woodbend member of Devonian coral-reef limestone.

Generally, 1958 was better for Alberta's natural-gas discoveries, but frustrating as prospects for markets receded. In Alberta's foothills, British American-Shell Berland River A8-4-59-23 wildcat (lsd 8-4-59-23W5), with an open-flow potential of 1½ billion cubic feet per

(*Continued*)



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day, set a record as the world's largest gas well. At 12,677 ft, it also was Canada's deepest gas producer, with 551 ft the thickest net pay zone for a Canadian gas well. Completed in the Devonian D-3 in a coral-reef structure, its reserves may well exceed three trillion cubic feet. It has been estimated that, even on an MPR rating, the single well could supply the entire 540 million initial capacity of the Trans-Canada pipeline.

In Alberta's high central foothills, north of Banff, Shell's Panther River 1 wildcat (1sd 5-19-30-10W5) in the Devonian-Mississippian limestone had the highest sulfur content recorded in a Canada well.

Three long stepouts in the Watertown Park-Castle River gas-discovery trend, extending more than 17 miles at the south end of the foothills, significantly extended this multi-trillion reserve. Texas Gladstone Creek A-6-15-5-2 (1sd 6-15-5-2W5) was near the trend's center; Texaco Castle River B6-17-6-2 (1sd 6-17-6-2W5) was near the north end; and Shell Waterton 2 (1sd 7-2-4-1W5) was a four-mile extension at the southeastern end. Topping this foothills gas-discovery play was indication of another huge Mississippian reservoir in BA-Triad Lovett River 12-30-46-18 wilcat (1sd 12-30-46-18W5). In the west-central foothills, it was completed with initial potential of 17 mmcf per day.

British Columbia: In B.C.'s prolific northeastern corner, wildcatting increased in 1958 with discovery of numerous small to medium-sized gas reserves. One gas success out of every four wildcats drilled registered a phenomenal success ratio. Outstanding strike of the year was joint Dome-Basco Laprise Creek 1, unit 35, zone H, map 94-G-8, 22 miles northwest of the major Nig Creek gas field, completed with estimated initial potential of 25 mmcf per day.

Large crown reserve exploration permits during the year involved several million acres checkerboarded throughout the province as far north as the Northwest Territories border. Bulk of the new permits was taken up by major companies.

Saskatchewan: Near exhaustion of desirable sites for development drilling, absence of major new discoveries during the year, and leveling off of domestic and export markets for crude caused exploration activity to decline sharply in 1958, but success ratio in Saskatchewan was sustained on reduced volume. Continuing as almost the only discovery zone was the Mississippian limestone in southeastern Saskatchewan. Near year-end, Imperial Oil Ltd. completed as a gas producer Bayhurst 6-16 wildcat (1sd 6-16-24-25W3) in west-central Saskatchewan. Initial potential was 6.2 mmcf per day in the Viking sand.

Manitoba: For the first time since oil discovery in the province in 1951, crude production started to decline in 1958. With an overloaded market and lack of cash, companies almost ceased drilling. A stepout at Routledge discovered a moderate-sized pool, adding an estimated 40 potential well sites in the Virden area.

Eastern Canada: Ontario sprang into the forefront of offshore drilling under Lake Erie during 1958. A rush for lease and exploration permits followed successful development of two different types of offshore platforms. In the Maritime Provinces, Imperial Oil Ltd. resumed oil search on Prince Edward Island in 1958. It drilled three dry holes on the island, and started one wildcat in New Brunswick which was still drilling at year-end.

Northwest Territories: 1958 extended the push to the north for new large blocks by the major companies which alone can afford to hold enormous tracts for future development in this region remote from near-term markets. There was no wildcat drilling during the year.

CANADA—Crude-Oil Receipts, 1958
(Total Barrels Per Month)

Month	Domestic	Imports	Total
January	12,332,277	8,221,773	20,554,050
February	10,811,108	8,575,641	19,386,749
March	10,801,433	7,354,452	18,155,885
April	9,647,023	7,195,333	16,842,356
May	9,821,853	9,250,727	19,072,580
June	10,205,468	9,598,778	19,804,246
July	12,300,252	9,574,741	21,874,993
August	11,797,590	9,753,453	21,551,043
September	10,944,960	8,260,703	19,205,663
October	11,400,000e	9,600,000e	21,000,000e
November	11,000,000e	9,000,000e	20,000,000e
December	11,500,000e	9,600,000e	21,100,000e
Totals	132,561,964	105,984,601	238,546,565

e—estimated

NATURAL GAS: Brightest factor in Canada in 1958 was production of natural gas for export through Westcoast Transmission pipeline; but disappointment followed the interim report on gas by the Borden commission, late in October, which recommended suspension of further permits pending new rules for export applications. However, completion in October of Trans-Canada's pipeline to eastern Canada has provided an outlet for increased gas production in 1959. With initial throughput of 186 mmcf per day, expected peak load of 263.4 mmcf during the winter had been expected.

Alberta Oil & Gas Conservation Board reported in September 23.3 trillion cubic feet of proved gas reserves in Alberta as of March 31, 1958—4.2 trillion over its previous report in 1956. Out of 20.8 trillion within economic reach, the board considered 4.1 trillion cubic feet as surplus to all reasonably foreseeable Canadian requirements for 30 years and thus available for export.

Natural-gas production, including associated gas flared in the field, was estimated at 400 billion cubic feet in 1958, a remarkable increase over the 280 billion actual production in 1957. With completion of the Trans-Canada pipeline, 1959 forward estimate is for at least 500 billion cubic feet.

During the year, a large extension was constructed to Westcoast Transmission's gathering system in northern B.C.; and gas production was stimulated by completion of the Westcoast Transmission pipeline in the fall of 1957 and by initial two months' operation of the Trans-Canada line late in 1958.

Two major gas-conservation plants, put on-stream late in 1958, started salvage of flared gas. However, gas waste in 1958 still amounted to some 85 billion cubic feet, about the same as in 1957. Several other large salvage projects await approval of gas-export plans. The Pembina oil-field plant of Goliad Co., west-central Alberta, is handling about 50 mmcf per day of salvaged gas for the city of Edmonton. The smaller Steelman Gas Co. plant, southeastern Saskatchewan, is supplying 25 mmcf per day initially to Saskatchewan Power Corp. lines (ultimately 45 mmcf).

In October 1958, British American Oil Co.'s Pincher Creek plant got into full swing in southern Alberta, with delivery of 100 mmcf per day of gas to Trans-Canada Pipe Lines Ltd. from its high sulfur-content field. Plant is rated at 240 mmcf per day. It was followed in November by Hudson's Bay Oil & Gas Co. plant at Cessford, eastern Alberta, with 90 mmcf per day.

Natural gas showed a highly expansive trend throughout the year in production and capital facilities.

TRANSPORTATION: Phenomenal gas expansion, along with completion of the Trans-Canada pipeline, raised total pipeline mileage in 1958 by 4,200 miles, a construction record exceeded only by 1957. Principal single job was Trans-Canada's 853-mile 30-in. northern and central Ontario section completed in October, laterals and local distribution lines adding another 1,200 miles. Saskatchewan Power Co. almost doubled its lines with addition of 500 miles. Alberta Gas Trunk Line added some 237 miles of main and lateral lines in its all-Alberta grid.

The total 3,600 miles of new natural-gas pipelines was supplemented by about 600 miles of crude lines, consisting mainly of 82 miles of main-line loop for Interprovincial Pipe Line Co. in Saskatchewan and Alberta, and 125 miles of new main line from the big Swan Hills oil field to Edmonton. The main-line total at year-end 1958 was close to 11,000 miles, not including loops, in both oil and gas pipelines.

PRODUCTION: Canadian crude production declined in 1958 for the second consecutive year. Because of abrupt cutting down of export markets on the Pacific Coast, Alberta suffered a disproportionate share of the lag, just as it had experienced a windfall share of the increase in 1956 caused by the Suez Canal crisis. Tanker rates continued at such low levels that Canadian crude for the West Coast, supplied exclusively from Alberta, ceased to be competitive even in Vancouver, where national policy kept its markets open against the actual lower potential laid-down cost of imported crude. By an exchange arrangement involving imports on the East Coast, where imported crude is the sole source of supply, a small minimal export market was retained on Puget Sound.

Total Canadian crude production in 1958 was average 451,400 b d—down from 182.4 million (500,000 b d) in 1957. Alberta's 111 million barrels was down 20% from 138 million in 1957. Saskatchewan produced 44.6 million barrels, up 21% from 36.8 million in 1957. The other producing provinces together registered practically no change at 7.5 million barrels.

For a difficult year worldwide, the 1958 Canadian domestic crude market was excellent at 132 million barrels, four million over 1957. Exports slumped by 23½ million to 31 million from 1957's 54.6 million barrels, even though Saskatchewan and Manitoba had a satisfactory increase of nearly 3½ million to offset in part Alberta's decline of nearly 27 million barrels. A major factor in the sustained market for domestic crude was the deliberate diversion of crude runs from Montreal to Toronto and Sarnia refineries by integrated companies with capacity in both areas, thereby substituting western domestic crude for imported supplies.

During 1958, Saskatchewan medium-gravity crude in the southeastern sector became subject to proration for the first time, as markets failed to develop as fast as producibility.

Industry forecasts estimate Canadian crude production in 1959 will average 500,000 b d to 505,000 b d, an increase of 11% to 12% over 450,000 b d average for 1958.

Crude-oil reserves in Canada as of January 1, 1959, have been estimated at 3.150 billion barrels.

Exports and Imports: The export market for Canadian crude declined steadily in early 1958; became fairly well stabilized by midsummer; and later flattened out compared to 1957. The year's estimated total exports of 31 million barrels were off nearly 43% from 1957's all-time high. Alberta's crude exports dropped to 13½ million from 40,405,104 in 1957. Saskatchewan and Manitoba exports rose to 17½ million from 14,200,000 in 1957. Alberta's crude displaced

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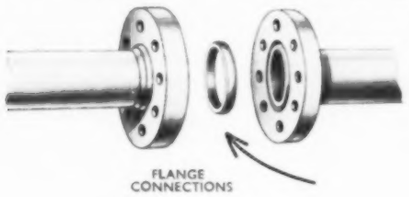

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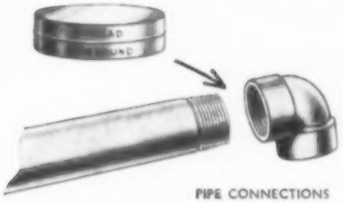

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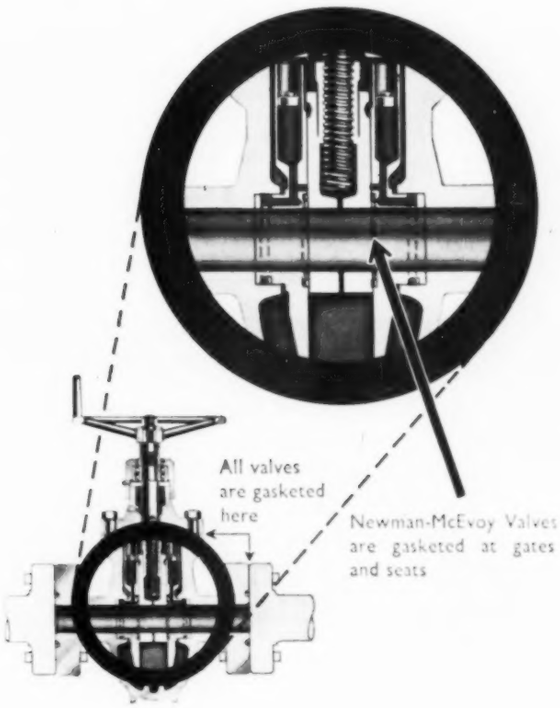

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Saskatchewan's and Manitoba's in the northern USA as Alberta shipments declined to 4.6 million barrels from 6.3 million. Exports from the more easterly provinces rose to 17.5 million from 14.2 million. This provided the industry altogether with a net gain in crude exports to District II of 1.6 million in a year of general business and industrial recession.

Crude imports in 1958 slumped 4½%—to 106 million barrels from 111 million—because of reduced volume at refineries in Quebec and the Maritime Provinces, plus a diversion to domestic from foreign sources of most of the remaining crude supply for Ontario refineries. However, in terms of foreign-currency supply, net effect of the year was quite adverse. The adverse trade balance was 75 million barrels of crude contrasted with an adverse balance of 56.4 million in 1957.

REFINING: Construction projects completed during 1958 added 56,750 b d to Canadian refining capacity, raising national total to 823,100 b/d. Most important contribution to potential increase in domestic crude use was completion of Cities Service's new 20,000 b d refinery in Toronto which went onstream in November. The only other completely new project was the 20,000 b d Port Moody, B.C., refinery of British American Oil Co. Ltd. in the Vancouver area, which went onstream in October.

Refinery runs in 1958 were unchanged from the 1957 level due to leveling off in product demand. Overall, crude receipts closely paralleled runs to stills. Total crude receipts for the year, estimated at 238,500,000 bbl, averaged 654,000 b/d, compared with total 1957 of 238,816,934 bbl. There was a material change in domestic supply, however, with an estimated 132.5 million barrels (up from 127.8 million in 1957) in contrast to a decline in imports to 106 million from 111 million, or a change of five million barrels in each direction.

CANADA—Oil-Production Schedules, 1958
(Total Barrels)

Month	Alberta	Saskatchewan	Manitoba	Others	Total
January	10,846,297	3,835,753	522,366	125,799	15,330,215
February	10,343,370	3,566,100	470,350	90,013	14,470,341
March	9,960,381	3,841,636	519,656	135,925	14,457,598
April	8,019,992	3,421,583	475,001	123,203	12,039,779
May	8,244,104	3,677,574	515,277	125,331	12,562,296
June	8,232,625	3,572,442	501,080	147,195	12,453,346
July [a]	10,274,309	3,729,126	512,120	163,192	14,678,747
August	9,187,145	3,964,148	488,812	160,000	13,800,105
September	8,675,856	3,900,000	462,978	150,000	13,188,834
October	8,860,000	3,720,000	480,000	130,000	13,190,000
November	9,000,000	3,600,000	450,000	130,000	13,180,000
December	9,356,000	3,780,000	480,000	120,000	13,736,000
Totals	111,000,579	44,608,374	5,877,642	1,600,666	163,087,261

Note: All figures are actual to following dates, inclusive: Alberta, September; Saskatchewan, August; Manitoba, September; others, July; remaining figures are estimates.

Crude-oil receipts by refineries were down in every province except Alberta and Manitoba, where each had a modest increase, and Ontario which had a major rise of nearly 7%. British Columbia, which suffered from labor problems and a summer depression, declined the most—with Saskatchewan second and the Quebec-Maritime region third. Imports of crude into Ontario were cut by almost 40% (some three million barrels), while in other eastern provinces imports declined by about two million barrels.

CANADA—Proved Liquid Hydrocarbon Reserves
(Barrels)

CRUDE OIL	As of Jan. 1, 1958	As of Jan. 1, 1959
Northwest Territories	52,858,000	52,409,000
Alberta & British Columbia	2,353,026,000	2,581,610,000
Saskatchewan	420,457,000	497,392,000
Manitoba	34,258,000	27,500,000
Ontario and New Brunswick	3,855,000	7,055,000
TOTAL CRUDE OIL	2,864,454,000	3,165,904,000
NATURAL GAS LIQUIDS	394,660,000	484,193,000
TOTAL LIQUID HYDROCARBONS IN CANADA	3,259,114,000	3,650,097,000

MARKETING: For the first time since World War II, almost no advance occurred in total consumption of oil products in Canada in 1958. Allowing for a decline in imports of five million barrels—to 29 million from 34 million—domestic products gained a market of about 13 million barrels. In Toronto and Winnipeg and other areas, competition was more intense than ever in gasoline marketing—retail price of No. 2 gasoline in Toronto reaching 28.9¢ per Imperial gallon during the summer. A four-year

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price war in Winnipeg kept No. 2 between 30.9¢ and 32.9¢ throughout the year.

Marketing in the eastern provinces was chaotic most of the year. British Petroleum claimed more than 400 new service stations for the year, while Petrofina added some 300. Other Ontario companies campaigned to push back the competitive boundary of Quebec products. Cities Service started an $8 million program. Overshadowing the whole marketing outlook for oil in the East was Trans-Canada's announcement it would displace by 1961 the equivalent of 49,000 b/d of oil products through sale of natural gas for domestic and industrial uses.

Canada's oil consumption in 1958 (crude-equivalent basis), estimated at 785,000 b/d, was about 6½% over 1957.

NATIONAL FACTORS

Under the aegis of the Conservative Party, epochal policy-making decisions at the national level were introduced during 1958 for Canada's oil—with intent of the dominion government to widen its jurisdiction over all phases of the petroleum industry. Widespread fears have been expressed, in and out of Canada, as to the impact on future industry operations and investment favorability in a country which traditionally has maintained a climate friendly to investment from abroad. Last year alone, it is estimated, $213 million was invested in new western Canadian wells.

The present government's position was confirmed by the principal terms of reference with which the Borden Royal Commission on Canada's Energy Resources was given its assignment. The Borden commission's subsequent report recommended a national energy board with broad regulatory powers, and steps toward its creation are expected from the 1959 Canadian parliament.

Broadly, the blueprint of regimentation recommended by the Borden commission would (1) give the proposed national energy board permanent status; (2) give it jurisdiction over pipelines crossing dominion borders; (3) empower it to issue export licences for oil and gas; (4) fix fair and reasonable consumer prices; (5) issue quotas for oil and gas production and conservation, refining, and transmission between provinces as well as outside Canada; (6) review and negotiate (both forward and retroactive) markets, contracts, investments, prices, tariffs, tolls, etc.

Investment Favorability: The Honorable Gordon Churchill, Minister of Trade and Commerce, at Ottawa, has written the following letter to *World Petroleum Report*:

"I wish to assure you that Canada continues to welcome, as she has traditionally done, investment by international companies in oil exploration and development, as in virtually all forms of commercial and industrial enterprise in Canada.

"Even during wartime and postwar periods of grave foreign-exchange difficulty, Canada has protected the freedom of foreign investors to remove from Canada the profits of their investments, and has interfered as little as possible with their freedom to remove their capital at will. Although a large proportion of investment in some of our resource industries, among them our oil industry, is controlled by non-Canadians, the government does not consider it appropriate or desirable to restrict the movement of capital into Canada, or the removal of earnings or capital itself from Canada.

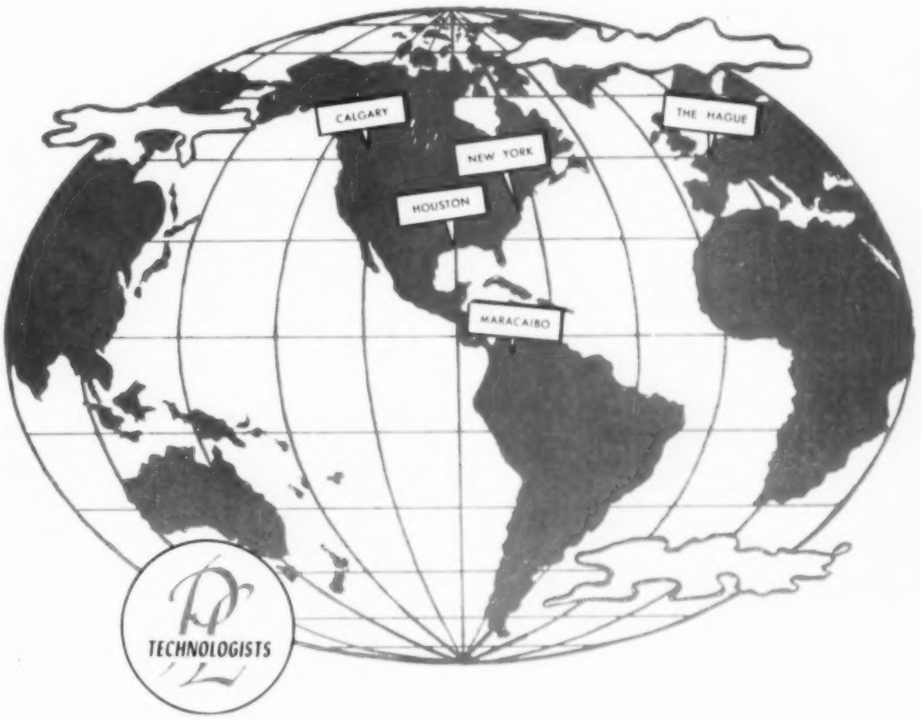
"We believe that foreign-controlled enterprises will find it a matter of enlightened self-interest to conduct themselves as Canadian companies, to use Canadian personnel so far as possible in senior management as well as less senior positions, and to make it possible for Canadians to share in the profits—and the risks—of the undertaking. These are not legal requirements; they are simply obvious means by which capital from abroad can share most fully, within the conditions which exist in Canada, in the many opportunities for development which exist here now and will arise in the future.

"You know of course that natural resources, including oil and gas, are under the jurisdiction of the provinces. What I have said is meant primarily to apply to matters under the jurisdiction of the government of Canada, but I can assure you that the governments of the provinces in which oil and gas have been found, or are being sought, extend a welcome to foreign capital which is invested in these industries, and take pains to ensure its equitable treatment."

OIL'S IMPORTANCE TO CANADA

The relative importance of oil in Canada is shown by a government estimate of 1958 indicating that approximately 55% of Canada's energy supply is derived from petroleum and natural gas.

The contribution of oil to the national income is difficult to assess; however, in the province of Alberta during the fiscal year 1956-57, oil revenues contributed 50% of total revenues.



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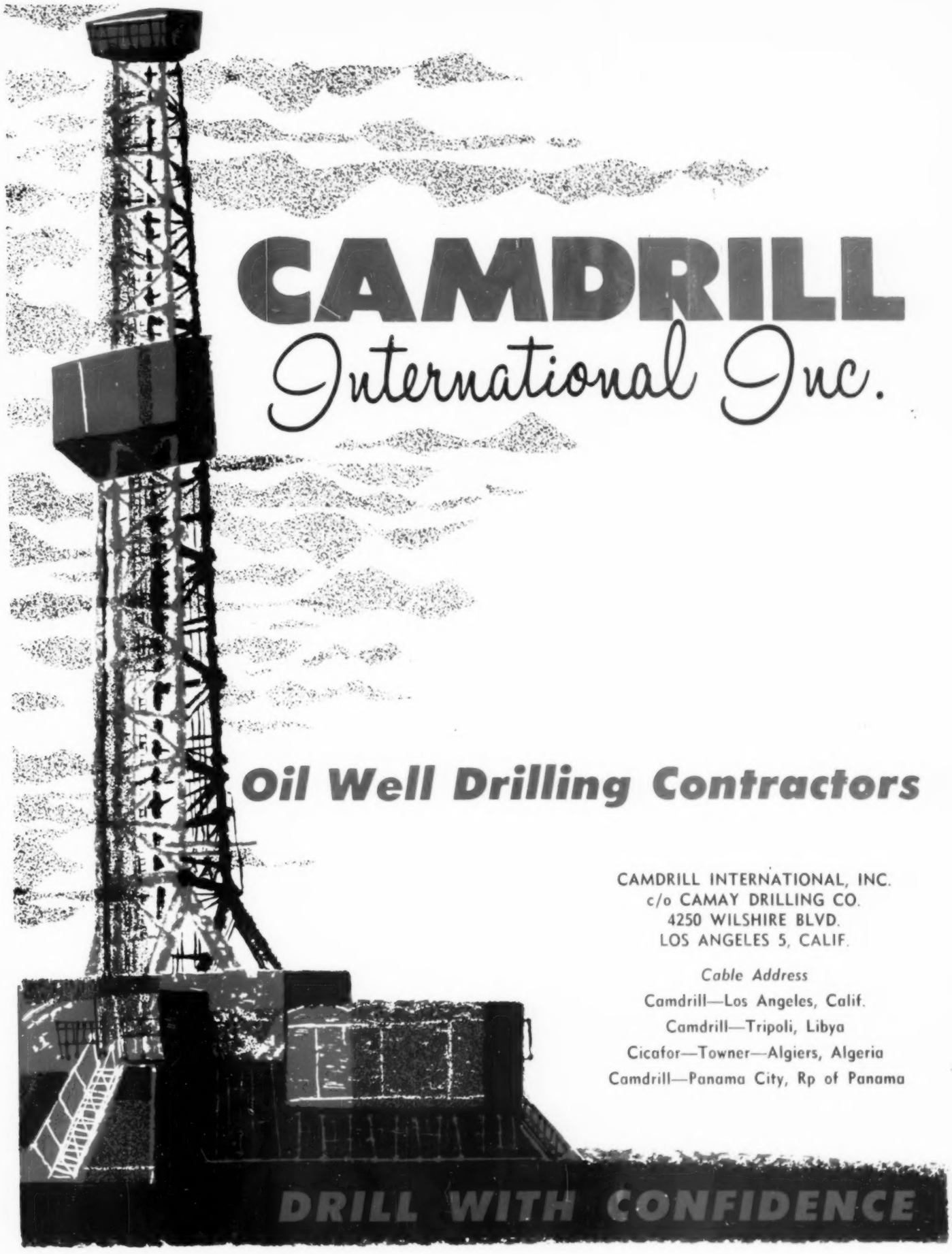

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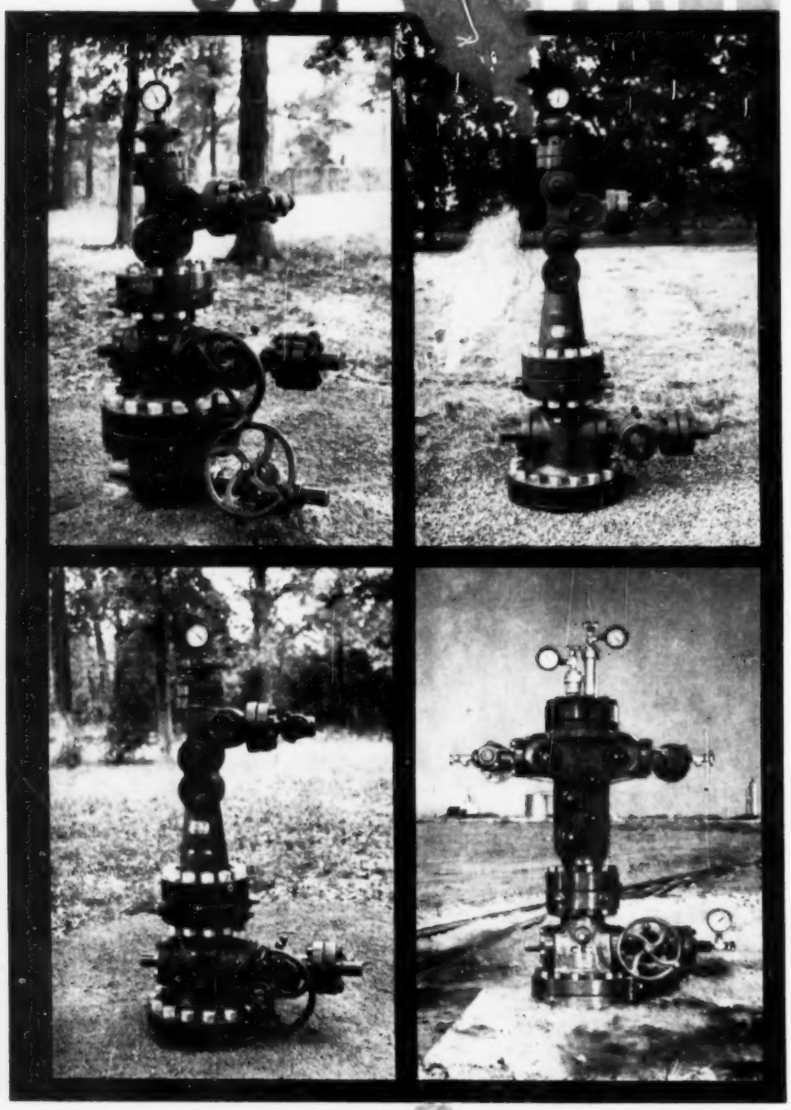

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